

**NRVIS/LIO
USER GUIDE
to the
FOREST RESOURCES
INVENTORY STATUS
Data Class**

Issued: 2011-MAR-07

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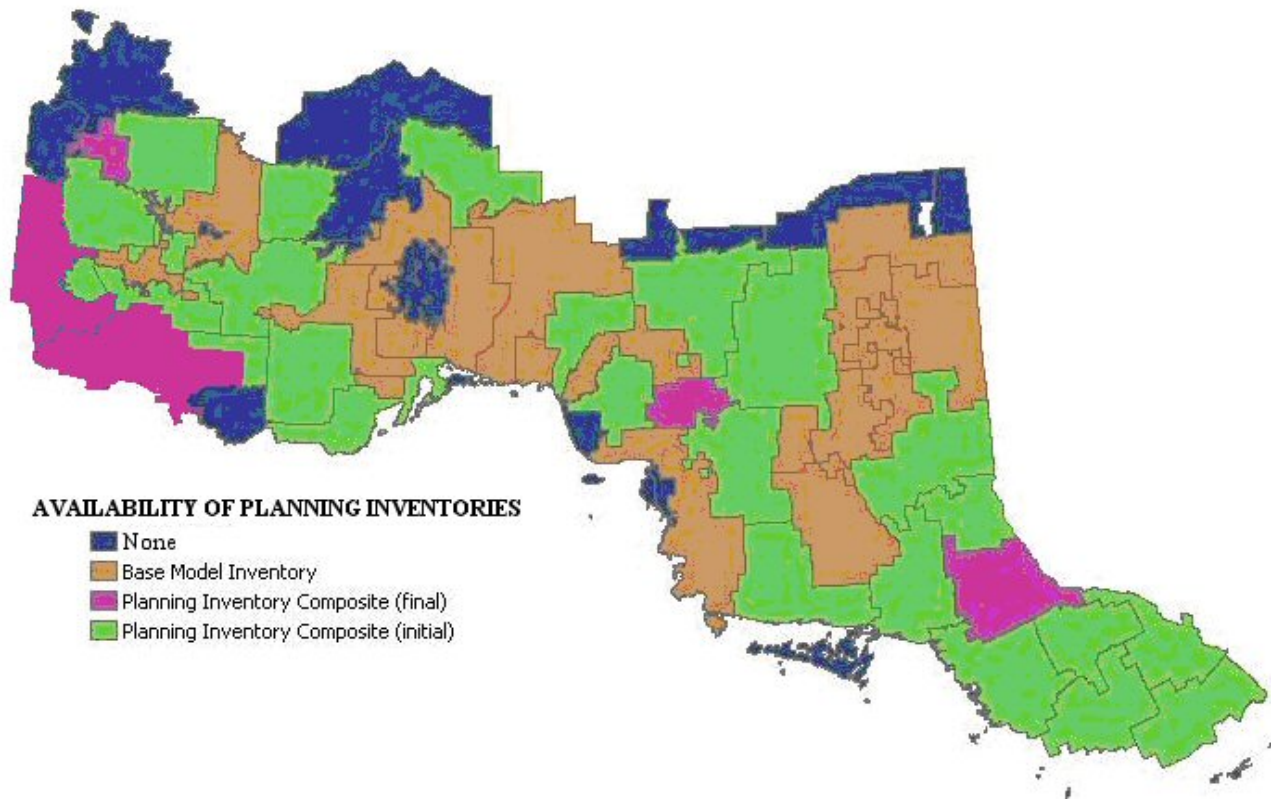
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Introduction

This guide provides the user with basic information about the current status for Forest Inventories in the province of Ontario. The primary focus of this layer is to provide a current production status of Forest Information Manual (FIM) compliant inventories produced from 2004¹ onwards that are loaded into the Forest Cover data class in the Land Information Ontario geospatial database. This layer has been defined, and will be maintained by the Ontario Ministry of Natural Resources, Inventory Monitoring and Assessment (IMA), IMA Services section on behalf of the IMA's Forest Resources Inventory Program (FRI).

Provisions have also been made to include information in this layer about the availability of other Forest Inventories prepared into packaged products that are described in this document. It is intended that where available, the Structured Data (Forest Cover Data Class) and alternate Packaged Products will be available for download from the Ontario Land Information Warehouse (OLIW) through the Land Information Data Subscription (LIDS) service. Packaged Products containing pre-FIM compliant forest inventories may also be of interest to users studying forest landscape history. The general process and origins of these packaged products is described on the following page.

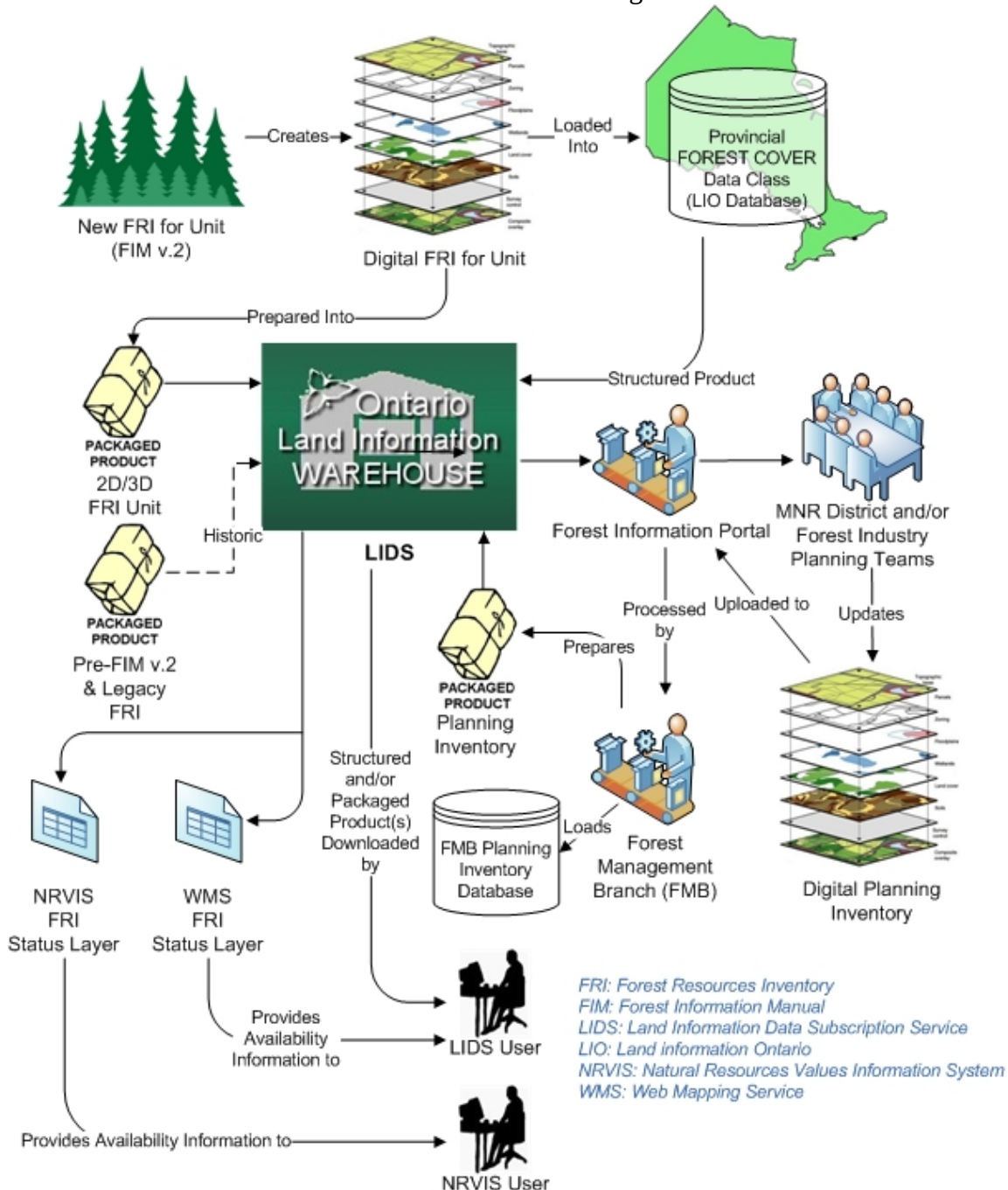


Above: FRI Status layer – this example breakdown showing the availability of Planning Inventory types.

¹ Also referred to as FIM version 2

General Overview of FRI Packaged Product Type Information Flow

Below is a general process-flow overview of how the various FRI Products are prepared and loaded into the LIO Warehouse and available through LIDS.



In essence, every new Forest Resources Inventory (FRI) produced from 2004 onward is:

- Digital and compliant to the Forest Information Manual 2007 (FIM 2007) technical specifications (spatial and attributes) and is archived in the FRI database.
- Loaded into the provincial Forest Cover data class in the LIO database, where it can be downloaded as a structured data product through LIDS.

- The Unit's FRI is also prepared into a standalone Packaged Product (2D/3D version) and uploaded to the Ontario Land Information Warehouse server where it can be downloaded through LIDS.

Planning Composite Inventories are also prepared into Packaged Products which are available through LIDS.

Previous Pre-FIM versions of the FRI (various vintages) are, where available prepared into Packaged Products that are available through LIDS.

The FRI Status layer thus becomes a useful tool to a user for determining the availability of Structured and/or Packaged Products for forest inventory data for their geographical (and historical) area(s) of interest.

The remainder of this guide explains and provides examples of the different types of forest inventory products and their availability from the information stored in the status layer.

CAVEAT

It is important to note that of the FRI Packaged Products; only the ones created for FIM compliant and Planning Inventories are considered authoritative and will receive technical support.

FRI Status Layer Attributes

This layer provides the general current production status of all Forest Resource Inventory (FRI) units in the province of Ontario. It also indicates the availability of digital inventories from the Land Information Ontario Warehouse (LIOW) as structured (Forest Cover data class) and as Packaged Products (zip file) through the Land Information Data Subscription (LIDS) service.

Forest inventories are differentiated by the following two versions or products:

1) Forest Resource Inventory (FRI):

This version is the initial or first new data capture of the forest resource inventory for a unit that is delivered to OMNR Districts and Sustainable Forest Licence (SFL) holders. In most cases, it involves the complete re-inventory of the forested land within a unit. It provides a basis for Planning Composite Inventories described below.

2) Planning Composite Inventory (PCI):

Once delivered, the FRI (1) is updated by OMNR Districts and Forest Companies for Forest Management Planning purposes. Spatial and attribute data are updated on an as-required or scheduled basis to reflect changes to the forest landscape (e.g. natural disturbances, harvesting and regeneration). The planning inventory contains additional attributes and information that conform to current Forest Information Manual standards designed to support the forest management planning process.

Note:

- The majority of FRI unit boundaries represented in this layer reflects, and are kept current to the latest version of the Forest Management Unit boundary layer.
- In the remainder of this document and in the FRI Status layer and packaged product names, the acronym “FIMv1” refers to the Forest Information Manual standards established in 2001 and the acronym “FIMv2” refers to the Forest Information Manual standards updated in 2007.

The following attributes are collected for each unit in the FRI Status layer.

Attribute	Description and Context
FMF Object Id	System-generated object identifier, unique at the application level.
Forest Resources Inventory Unit Type	The general type of feature represented by the Forest Resource Inventory (FRI) Unit. Permissible values include: - Forest Management Unit - Provincial Park - National Park - Island - To Be Defined Note: A value of "To Be Defined" indicates that a Forest Resource Inventory exists for the unit, but is waiting to be officially classified into one of the other unit categories e.g. Forest Management Unit.
Forest Resources Inventory Unit Name	The name that the Forest Resource Inventory Unit is known by. It usually shares the same name as the Forest Management Unit (FMU) that the Forest Resource Inventory is associated to.
Forest Management Unit Identifier	Where applicable, identifies the Forest Management Unit (FMU) that the Forest Resource Inventory is associated to. Also known as the FMU Number, an alphanumeric identifier uniquely assigned to every official Forest Management Unit in Ontario.
Forest Resources	The current status of the Forest Resources Inventory (FRI). The FRI status is

Attribute	Description and Context																				
Inventory Status	described sequentially as follows: <table border="1" data-bbox="521 247 1365 1045"> <tr> <td>Planning:</td><td>(Stage 0) The FRI is in a planning or pre-production stage.</td></tr> <tr> <td>Imagery Acquisition:</td><td>(Stage 1) Imagery is being, or has been acquired for the upcoming FRI area of interest.</td></tr> <tr> <td>Fieldwork:</td><td>(Stage 2) Fieldwork and calibration plots are underway for the FRI.</td></tr> <tr> <td>Water Classification:</td><td>(Stage 3) Waterbody analysis and classification from the latest imagery is underway through automated imagery analysis to reflect the current state of waterbodies (lakes, ponds and rivers) that will provide a land base for the FRI.</td></tr> <tr> <td>Photo Interpretation:</td><td>(Stage 4) The digital classification of forest types and ecosites is underway.</td></tr> <tr> <td>Automation and QA:</td><td>(Stage 5) The FRI is quality assured to ensure that the data conforms to Forest Information Manual (FIM) specifications used at the time of the inventory.</td></tr> <tr> <td>Complete:</td><td>(Stage 6) The digital FRI is complete and is waiting for delivery, or has been delivered to the OMNR District/Forest Company.</td></tr> <tr> <td>Archived:</td><td>a) Archiving the unit in the FRI database. b) loading the FRI data into the Land Information Ontario Warehouse (LIOW) Forest Cover data class. c) making structured 2D/3D versions of the FRI available via LIDS as a packaged product.</td></tr> <tr> <td>Archived (Pre-FIM):</td><td>The only FRI available has been archived in the FRI database before 2004; and the data structure does not reflect FIM 2007 standards (FIM v.2).</td></tr> <tr> <td>None:</td><td>A current status is unavailable or is not applicable for the unit.</td></tr> </table> User Tip: Symbolizing the layer according to contents of the status field provides a visual breakdown of each FRI Unit's current status.	Planning:	(Stage 0) The FRI is in a planning or pre-production stage.	Imagery Acquisition:	(Stage 1) Imagery is being, or has been acquired for the upcoming FRI area of interest.	Fieldwork:	(Stage 2) Fieldwork and calibration plots are underway for the FRI.	Water Classification:	(Stage 3) Waterbody analysis and classification from the latest imagery is underway through automated imagery analysis to reflect the current state of waterbodies (lakes, ponds and rivers) that will provide a land base for the FRI.	Photo Interpretation:	(Stage 4) The digital classification of forest types and ecosites is underway.	Automation and QA:	(Stage 5) The FRI is quality assured to ensure that the data conforms to Forest Information Manual (FIM) specifications used at the time of the inventory.	Complete:	(Stage 6) The digital FRI is complete and is waiting for delivery, or has been delivered to the OMNR District/Forest Company.	Archived:	a) Archiving the unit in the FRI database. b) loading the FRI data into the Land Information Ontario Warehouse (LIOW) Forest Cover data class. c) making structured 2D/3D versions of the FRI available via LIDS as a packaged product.	Archived (Pre-FIM):	The only FRI available has been archived in the FRI database before 2004; and the data structure does not reflect FIM 2007 standards (FIM v.2).	None:	A current status is unavailable or is not applicable for the unit.
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None:	A current status is unavailable or is not applicable for the unit.																				
Forest Resources Inventory Status Date	The effective date of the current Forest Resources Inventory (FRI) Status.																				
Forest Resources Inventory Status Comments	A short description providing additional information about the current status of the Forest Resources Inventory (FRI).																				
Source Imagery Description	Describes the type(s) of imagery used to define the original Forest Resources Inventory (FRI), along with year of capture if available. More information about the typical sources of imagery used to create the FRI can be found in the Examples of FRI Products section of this document.																				
Forest Resources Inventory Metadata Url	The internet web page address of the official metadata record for the Forest Resources Inventory Unit (FRI), created in the Ontario Land Information Directory (OLID) database.																				
Packaged Product Forest Resources Inventory 2D-3D Availability	Indicates the availability of packaged products created from the 2D and/or 3D version of the Forest Resources Inventory (FRI) for a unit. Both 2D and 3D versions of the FRI reflect Forest Information Manual (FIM) 2007 standards. Packaged products are available from the Ontario Land Information Warehouse through the Land Information Data Subscription (LIDS) service. The availability options are described as follows: <table border="1" data-bbox="521 1656 1365 1879"> <tr> <td>2D only:</td><td>Only the normal 2D version of the unit's FRI is available as a LIDS packaged product at this time.</td></tr> <tr> <td>3D only:</td><td>Only the normal 3D version of the unit's FRI is available as a LIDS packaged product at this time.</td></tr> <tr> <td>2D and 3D:</td><td>Both 2D and 3D versions of the unit FRI are available as a LIDS packaged product.</td></tr> <tr> <td>None:</td><td>Packaged products for the 2D and 3D versions of the unit FRI are not available at this time.</td></tr> </table>	2D only:	Only the normal 2D version of the unit's FRI is available as a LIDS packaged product at this time.	3D only:	Only the normal 3D version of the unit's FRI is available as a LIDS packaged product at this time.	2D and 3D:	Both 2D and 3D versions of the unit FRI are available as a LIDS packaged product.	None:	Packaged products for the 2D and 3D versions of the unit FRI are not available at this time.												
2D only:	Only the normal 2D version of the unit's FRI is available as a LIDS packaged product at this time.																				
3D only:	Only the normal 3D version of the unit's FRI is available as a LIDS packaged product at this time.																				
2D and 3D:	Both 2D and 3D versions of the unit FRI are available as a LIDS packaged product.																				
None:	Packaged products for the 2D and 3D versions of the unit FRI are not available at this time.																				

Attribute	Description and Context						
	When available, the name of the packaged product files can be found in the FRI Packaged Product Catalogue table. Note: Once downloaded, Geographic Information Systems (GIS) software is required to view the FRI data. Additionally, specialized hardware is required to view the FRI data in 3D. User Tip: Symbolizing the layer according to contents of this field provides a quick visual status of 2D/3D version availability as packaged products.						
Packaged Product Archived FIMv1 Forest Resources Inventory Availability	Indicates the availability and extent of an archived Forest Information Manual 2001 standards digital Forest Resources Inventory (FRI) packaged product for the unit. FMUs have been amalgamated over the years and the packaged product availability reflects the geographic extent coverage of the former archived FRI unit within the geographic extent of the current unit. The availability and extent for an archived FIMv1 FRI is listed as follows: <table border="1" data-bbox="524 688 1360 940"> <tr> <td data-bbox="524 688 784 772">Complete Coverage:</td><td data-bbox="784 688 1360 772">Packaged products for the archived inventories are available for the full geographic extent of the current FRI Unit.</td></tr> <tr> <td data-bbox="524 772 784 856">Partial Coverage:</td><td data-bbox="784 772 1360 856">Packaged products for the archived FRI is only available for a small geographic area within the current FRI Unit.</td></tr> <tr> <td data-bbox="524 856 784 940">None:</td><td data-bbox="784 856 1360 940">There are currently no packaged products available for the archived OBM-tiled FRI within the geographic extent of the current FRI Unit.</td></tr> </table> When available, the name of the packaged product files can be found in the FRI Packaged Product Catalogue table. User Tip: Symbolizing the layer according to contents of this field provides a quick visual status of the availability of this version of FRI packaged products.	Complete Coverage:	Packaged products for the archived inventories are available for the full geographic extent of the current FRI Unit.	Partial Coverage:	Packaged products for the archived FRI is only available for a small geographic area within the current FRI Unit.	None:	There are currently no packaged products available for the archived OBM-tiled FRI within the geographic extent of the current FRI Unit.
Complete Coverage:	Packaged products for the archived inventories are available for the full geographic extent of the current FRI Unit.						
Partial Coverage:	Packaged products for the archived FRI is only available for a small geographic area within the current FRI Unit.						
None:	There are currently no packaged products available for the archived OBM-tiled FRI within the geographic extent of the current FRI Unit.						
Packaged Product Archived Tiled Forest Resources Inventory Availability	Indicates the availability and extent of a pre-Forest Information Manual archived digital Forest Resources Inventory (FRI) tiled to individual Ontario Base Map (OBM) workspaces for the extent of the Forest Management Unit (FMU) that was defined at the time. FMUs have been amalgamated over the years and the packaged product availability reflects the geographic extent coverage of the former archived FRI unit within the geographic extent of the current unit. A clearer explanation of these unit amalgamations can be found in the downloadable Data Class User Guide for Forest Management Unit. The availability and extent for an archived OBM-tiled FRI is listed as follows: <table border="1" data-bbox="524 1360 1360 1612"> <tr> <td data-bbox="524 1360 784 1444">Complete Coverage:</td><td data-bbox="784 1360 1360 1444">Packaged products for the archived inventories are available for the full geographic extent of the current FRI Unit.</td></tr> <tr> <td data-bbox="524 1444 784 1528">Partial Coverage:</td><td data-bbox="784 1444 1360 1528">Packaged products for the archived FRI is only available for a small geographic area within the current FRI Unit.</td></tr> <tr> <td data-bbox="524 1528 784 1612">None:</td><td data-bbox="784 1528 1360 1612">There are currently no packaged products available for the archived OBM-tiled FRI within the geographic extent of the current FRI Unit.</td></tr> </table> When available, the name of the packaged product files can be found in the FRI Packaged Product Catalogue table. User Tip: Symbolizing the layer according to contents of this field provides a quick visual status of the availability of this version of FRI packaged products.	Complete Coverage:	Packaged products for the archived inventories are available for the full geographic extent of the current FRI Unit.	Partial Coverage:	Packaged products for the archived FRI is only available for a small geographic area within the current FRI Unit.	None:	There are currently no packaged products available for the archived OBM-tiled FRI within the geographic extent of the current FRI Unit.
Complete Coverage:	Packaged products for the archived inventories are available for the full geographic extent of the current FRI Unit.						
Partial Coverage:	Packaged products for the archived FRI is only available for a small geographic area within the current FRI Unit.						
None:	There are currently no packaged products available for the archived OBM-tiled FRI within the geographic extent of the current FRI Unit.						
Packaged Product Legacy Forest Resources Inventory Availability	Indicates the availability and extent of a Legacy (pre-digital) Forest Resources Inventory (FRI) within the geographic extent of the current unit. Where available, Legacy FRI manuscripts (hardcopy maps) are scanned to a PDF or image format (jpeg, bmp) and prepared as a packaged product that is available from the Ontario Land Information Warehouse through the Land Information						

Attribute	Description and Context								
	Data Subscription (LIDS) service. The availability and extent for a Legacy FRI is listed as follows: <table border="1" data-bbox="524 285 1362 480"> <tr> <td data-bbox="524 285 781 338">Complete Coverage:</td><td data-bbox="781 285 1362 338">Legacy FRI packaged products are available for a small geographic area within the current FRI Unit.</td></tr> <tr> <td data-bbox="524 338 781 390">Partial Coverage:</td><td data-bbox="781 338 1362 390">Legacy FRI packaged products are available for a small geographic area within the current FRI Unit.</td></tr> <tr> <td data-bbox="524 390 781 480">None:</td><td data-bbox="781 390 1362 480">There are currently no Legacy FRI packaged products available within the extent of the current FRI Unit.</td></tr> </table> When available, the name of the packaged product files can be found in the FRI Packaged Product Catalogue table. Note: Given their rarity, the availability of complete or partial Legacy FRI packaged products is very limited. User Tip: Symbolizing the layer according to contents of this field provides a quick visual status of the availability of this version of FRI packaged products.	Complete Coverage:	Legacy FRI packaged products are available for a small geographic area within the current FRI Unit.	Partial Coverage:	Legacy FRI packaged products are available for a small geographic area within the current FRI Unit.	None:	There are currently no Legacy FRI packaged products available within the extent of the current FRI Unit.		
Complete Coverage:	Legacy FRI packaged products are available for a small geographic area within the current FRI Unit.								
Partial Coverage:	Legacy FRI packaged products are available for a small geographic area within the current FRI Unit.								
None:	There are currently no Legacy FRI packaged products available within the extent of the current FRI Unit.								
Packaged Product Planning Inventory Type Availability	The availability and type of Planning Inventory that is available for download as a packaged product from the Land Information Ontario Warehouse through the Land Information Ontario Data Subscription (LIDS) service. The Planning Inventory Types available are as follows: <table border="1" data-bbox="524 783 1362 1066"> <tr> <td data-bbox="524 783 781 867">Planning Composite Inventory (initial):</td><td data-bbox="781 783 1362 867">(PCI) is the pre-planning inventory initial draft submitted 2 years before the forest management plan, and used for planning purposes. Does not require silviculture fields.</td></tr> <tr> <td data-bbox="524 867 781 930">Planning Composite Inventory (final):</td><td data-bbox="781 867 1362 930">(PCM) is the final submission at the forest management planning stage which includes all silvicultural fields</td></tr> <tr> <td data-bbox="524 930 781 1003">Base Model Inventory:</td><td data-bbox="781 930 1362 1003">(BMI) includes forecast depletions (generally two years worth), as well as all silvicultural fields.</td></tr> <tr> <td data-bbox="524 1003 781 1066">None:</td><td data-bbox="781 1003 1362 1066">A Planning Inventory packaged product is not available for the unit.</td></tr> </table> Where available, the name of the packaged product file can be found in the FRI Packaged Product Catalogue table. Note: Only one version of the most current Planning Inventory will be available as a packaged product through LIDS. Rule: When the value in this field is other than "None", the Update Year and Import Date fields must be populated. User Tip: Symbolizing the layer according to contents of this field provides a quick visual status of the availability of this version of FRI packaged products.	Planning Composite Inventory (initial):	(PCI) is the pre-planning inventory initial draft submitted 2 years before the forest management plan, and used for planning purposes. Does not require silviculture fields.	Planning Composite Inventory (final):	(PCM) is the final submission at the forest management planning stage which includes all silvicultural fields	Base Model Inventory:	(BMI) includes forecast depletions (generally two years worth), as well as all silvicultural fields.	None:	A Planning Inventory packaged product is not available for the unit.
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Base Model Inventory:	(BMI) includes forecast depletions (generally two years worth), as well as all silvicultural fields.								
None:	A Planning Inventory packaged product is not available for the unit.								
Planning Inventory Update Year	The start year of the 10-year planning period (e.g. 2012) that the forest stand age field has been updated/grown to in the forest resource inventory.								
Planning Inventory Import Date	The year that the planning inventory was imported into the Forest Management Branch's database and subsequently prepared as a LIO Packaged Product. The date is in character format and only includes the month and year (e.g. Dec. 2009).								
Additional Comments	Additional comments about the Forest Resources Inventory Unit.								
Effective Datetime	Date and time that the feature and record was created/updated in this layer.								

One or more packaged products for various inventory types and vintages may have been prepared for each unit in the status layer. Where they are available, each packaged product associated to a unit will be listed in the FRI Packaged Product Catalogue (child table). Each product listed in the catalogue is available for download from the Land Information Data Subscription (LIDS) service suite of packaged products. The information provided for each package product in the catalogue is as follows:

FRI Packaged Product Catalogue Table

Attribute	Description and Context												
FRI Status FMF Object ID	The Fmf Object Id of the parent Forest Resources Inventory Status unit polygon that the packaged product is associated to.												
Packaged Product Display Name	Name of the packaged product as it appears in the LIDS listing of available packaged products.												
Forest Inventory Type	Identifies the type or version of the Forest Resource Inventory that is included in the packaged product. <table border="1"> <tr> <td>FIMv2(2D)</td><td>FIM 2007 compliant format of the FRI that is suitable for 2D display and analysis in a GIS environment. Note: the Forest Cover LIO data class also conforms to this version of FIM.</td></tr> <tr> <td>FIMv2(3D)</td><td>FIM 2007 compliant format of the FRI that is suitable for use with imagery analysis software capable of recreating a 3D environment.</td></tr> <tr> <td>FIMv1</td><td>FIM 2001 compliant format inventory, where Sustainable Forest Licence (SFL) holders submitted a composite FRI which amalgamated their licensed (updated) inventory data with the forested crown land data.</td></tr> <tr> <td>OBM</td><td>Digital (GIS) FRI tiled to the Ontario Basemap (OBM) Grid using the Nad27 Datum. The inventories were produced during the period of 1986-2002 for every Forest Management Unit in the Area of the Undertaking. The majority of these inventories were compiled and digitized from delineated black and white aerial photography.</td></tr> <tr> <td>LEGACY</td><td>Legacy/historical hardcopy basemap/township tiled FRI that pre-date Geographic Information System (GIS). Where available, these maps were scanned as unorthorectified images (.jpg, .bmp or .pdf) which may not have accompanying forest stand attributes.</td></tr> <tr> <td>PLANNING</td><td>Post-FRI delivery Planning Composite Inventory. There should only be one package product for a Planning Inventory listed.</td></tr> </table>	FIMv2(2D)	FIM 2007 compliant format of the FRI that is suitable for 2D display and analysis in a GIS environment. Note: the Forest Cover LIO data class also conforms to this version of FIM.	FIMv2(3D)	FIM 2007 compliant format of the FRI that is suitable for use with imagery analysis software capable of recreating a 3D environment.	FIMv1	FIM 2001 compliant format inventory, where Sustainable Forest Licence (SFL) holders submitted a composite FRI which amalgamated their licensed (updated) inventory data with the forested crown land data.	OBM	Digital (GIS) FRI tiled to the Ontario Basemap (OBM) Grid using the Nad27 Datum. The inventories were produced during the period of 1986-2002 for every Forest Management Unit in the Area of the Undertaking. The majority of these inventories were compiled and digitized from delineated black and white aerial photography.	LEGACY	Legacy/historical hardcopy basemap/township tiled FRI that pre-date Geographic Information System (GIS). Where available, these maps were scanned as unorthorectified images (.jpg, .bmp or .pdf) which may not have accompanying forest stand attributes.	PLANNING	Post-FRI delivery Planning Composite Inventory. There should only be one package product for a Planning Inventory listed.
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LEGACY	Legacy/historical hardcopy basemap/township tiled FRI that pre-date Geographic Information System (GIS). Where available, these maps were scanned as unorthorectified images (.jpg, .bmp or .pdf) which may not have accompanying forest stand attributes.												
PLANNING	Post-FRI delivery Planning Composite Inventory. There should only be one package product for a Planning Inventory listed.												
Historic Unit Name	The documented name of the forest inventory unit that was in effect or known as at the time the inventory product was originally created (see Vintage). A succession of Forest Management Unit (FMU) boundary changes over the years resulted in the amalgamation of several units into a new FMU with a larger geographical extent. The extent of the historic unit in the packaged product will be nested within the boundaries of the currently associated unit.												
Inventory Vintage	Identified the vintage of the inventory contained in this packaged product. Examples: - 1985 - 2007 - 1950-55 - Pre-1963												
Packaged Product File Name	Identifies the file name of the packaged product. Refer to the section in this document pertaining to the respective file naming conventions for FRI and Planning Inventory packaged products.												
Packaged Product Description	A short description about the inventory contained in the packaged product.												
Upload Date	The known calendar date that the packaged product was uploaded to the Ontario Land Information Warehouse and made available through the Land Information Data Subscription System (LIDS).												

FRI Packaged Products

File Naming Convention

The file naming convention for FRI packaged products is as follows:

pp_FRI_<FRI_Type>_<UnitName>_<MU#>_<Year>.zip

where:

pp	(hardcoded)	= P ackaged P roduct	
_	(hardcoded)	Underscore separator	
FRI	(hardcoded)	= F orest R esource I nventry	
_	(hardcoded)	Underscore separator	
<FRI_Type>	(varies)	The type or version of the FRI included in the packaged product – listed as follows:	
		FIMv2_2D	FIM 2007 compliant format of the FRI that is suitable for 2D display and analysis in a GIS environment. Note: the Forest Cover LIO data class also conforms to this version of FIM.
		FIMv2_3D	FIM 2007 compliant format of the FRI that is suitable for use with imagery analysis software capable of recreating a 3D environment.
		FIMv1	FIM 2001 compliant inventory, where Sustainable Forest Licence (SFL) holders submitted a composite FRI which amalgamated their licensed (updated) inventory data with the forested crown land data.
		OBM	Digital (GIS) FRI tiled to the Ontario Basemap (OBM) Grid using the Nad27 Datum. The inventories were produced during the period of 1986-2002 for every Forest Management Unit in the Area of Undertaking. The majority of these inventories were compiled and digitized from delineated black and white aerial photography.
		LEGACY	Legacy/historical hardcopy basemap/township tiled FRI that pre-date Geographic Information System (GIS). Where available, these maps were scanned as unorthorectified images (.jpg, .bmp or .pdf) which may not have accompanying forest stand attributes.
_	(hardcoded)	Underscore separator	
<UnitName>	(varies)	The given name of the FRI Unit - and where applicable for legacy FRI Types - subunit e.g. township or basemap number. Note: For Legacy, OBM and FIMv1 FRI Types, as Forest Management Units have been amalgamated over the years, the given unit name may reflect the name and extent of the administrative forest management unit at the time of inventory.	
_	(hardcoded)	Underscore separator	
<MU#>	(varies)	The Management Unit # of the inventory.	
_	(hardcoded)	Underscore separator	
<Year>	(varies)	Year of Inventory	
.zip	(hardcoded)	file extension for compressed file format.	

The packaged product display names listed in LIDS would be similar to the example below:

LIDS Display Name	Packaged Product File Name
Quetico Provincial Park (PP) 2009 FIMv2(3D)	pp_FRI_FIMv2_3D_QueticoProvincialPark_PP_2009.zip

Examples of FRI Products

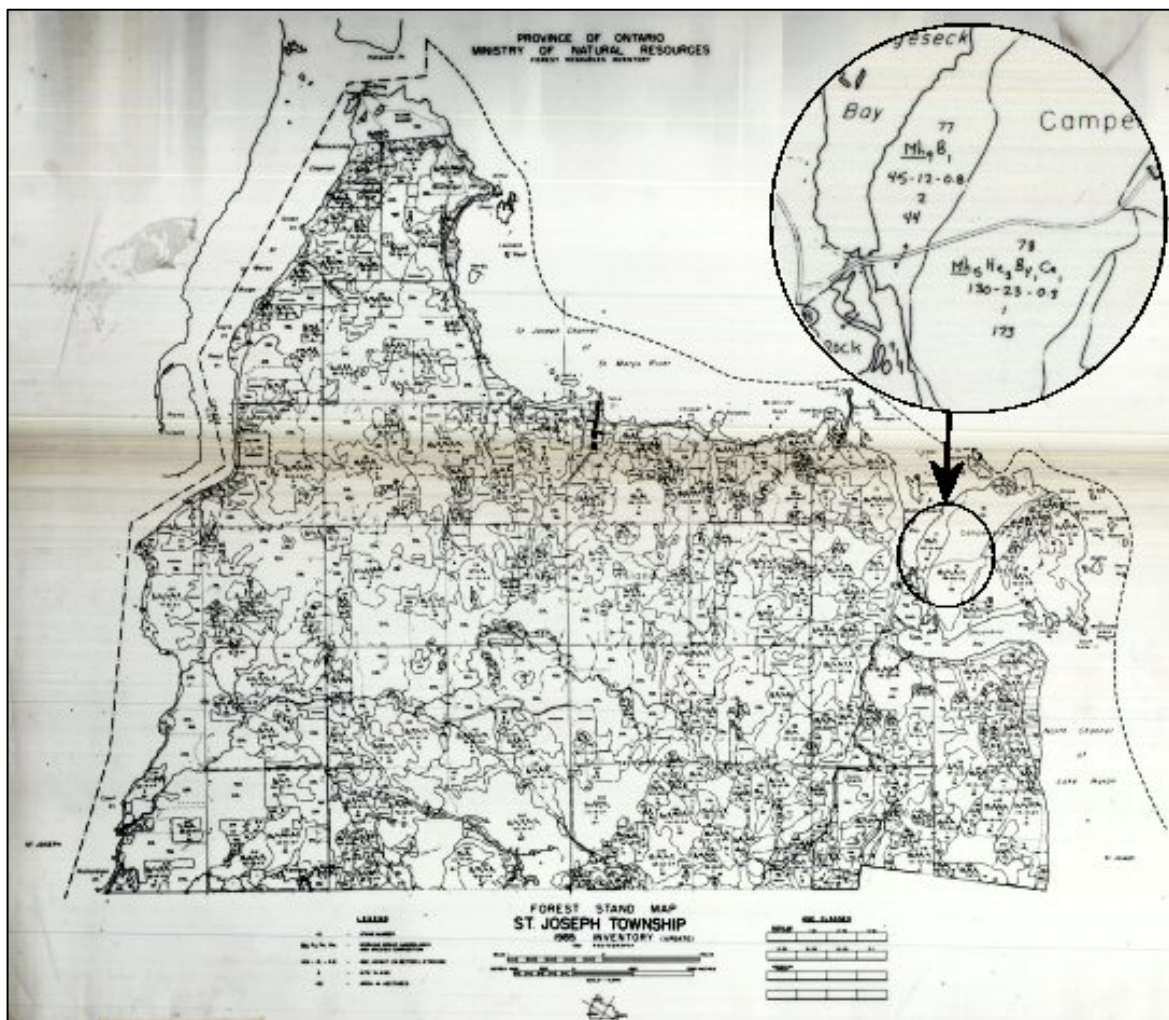
This section describes the general differences between the FRI versions that may be available as Packaged Products from LIDS. They are listed from the oldest type (Legacy) to the newest (FIM 2007 standards a.k.a FIM v.2).

Example of a Legacy FRI Product

CAVEAT

The data for this version of FRI Packaged Product should be used for comparative historical purposes only.

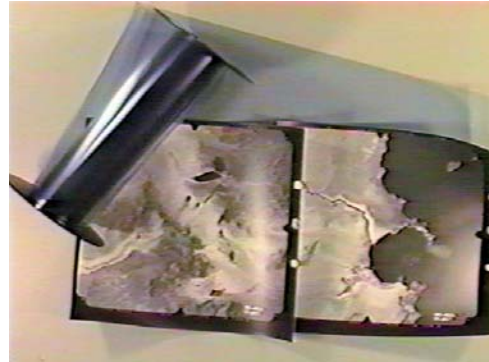
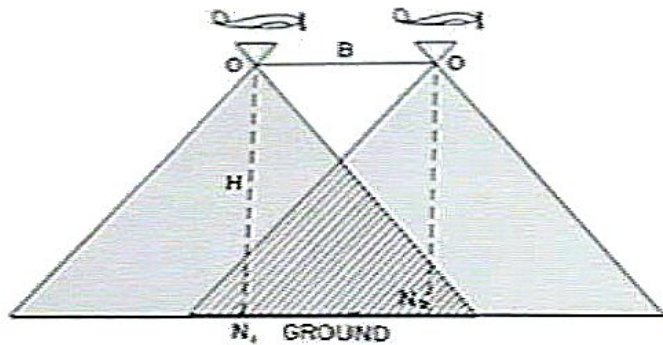
There will be a very limited number of legacy products available due to their rarity in making it into preservation. For the most part, the only forest stand information available will be what is displayed on the map. Legacy Forest Resources Inventories predate Geographic Information Systems (GIS) and as a consequence, most of this information is not digital. For packaged products, these legacy maps will be in a graphic format (i.e. jpg) which was scanned from the original map document.



Example of a scanned legacy FRI product with expanded view (circled)

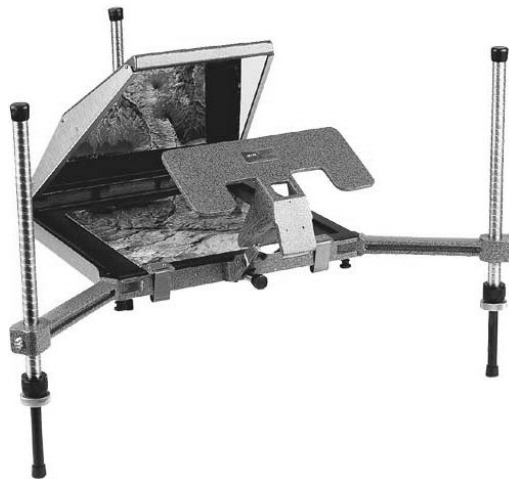
General Production Overview:

The information found on Legacy FRI maps owe their origins to the detail found on black and white 1:15840 aerial photography coverage for the area. The aerial photography was captured using a large-format camera onto 9-inch by 9-inch negative rolls from which positive prints were produced at the same scale. Overlaps between the aerial photographs permit the viewing of the landscape features in 3D by a skilled photo interpreter.



(Left) Desires coverage overlap between aerial photographs during flight and (right), the large-format negative and the positive print produced at the same scale.

These aerial photographs were initially used to create the map base template for the FRI showing only natural base features such as lakes, rivers, streams, roads and administrative boundaries. The template maps were drafted onto Mylar and tiled into either Geographic Township or Photo Base-Map map extents using a device called a Vertical Sketchmaster (pictured below).

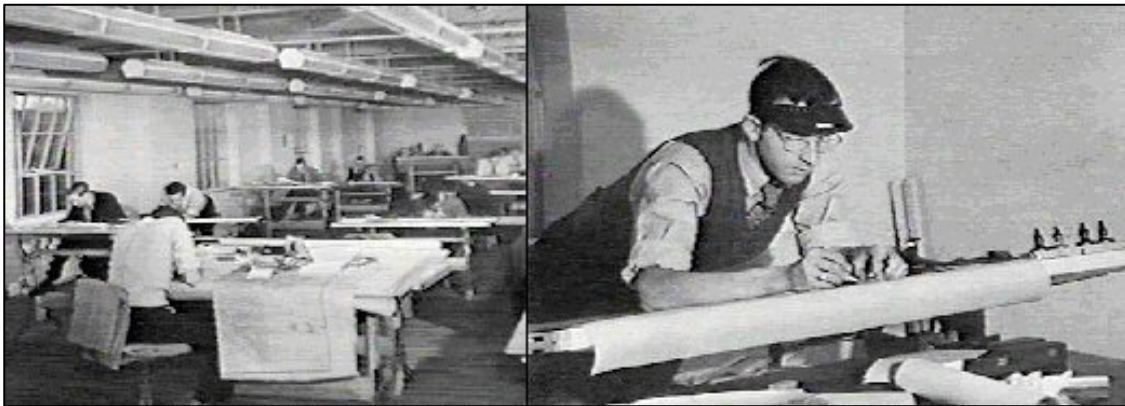


Vertical Sketchmaster

A Sketchmaster consisted of a mirrored lens which projected the aerial photograph on the map plot, and the three adjustable legs allowed the user to set the appropriate height/scale of the aircraft above the terrain along with simulating the tilt and pitch of the aircraft.

The mapping technician would look through the lens and sketch the projected features onto the map using a technical ink pen.

Productive and non-productive forest stand information was later delineated onto each photograph by the photo interpreter using a Pocket Stereoscope (pictured right). Stereoscopic viewing of the aerial photographs was achieved by the magnifying lens. It should be noted that the accurate interpretation of the FRI on aerial photographs is supplemented by extensive fieldwork which familiarize the interpreter with different landscape types and the forest community tree species that are found on them.



FRI production shop at Queen's Park, Toronto during the early 1950's.

The delineated forest information from the aerial photos was then compiled onto the 1:15840 scale Township or Photo Base Map tiles by the map technicians using the Vertical Sketchmaster. Forest attributes were written on the mapped forest stands – space permitting. Each productive forested stand was then assigned a number by the mapper. Special symbology was used to represent non-productive forested land such as treed and open muskeg and alder swales..

Forest attributes were manually compiled separately into ledgers and tabulated/grouped accordingly in order to obtain summaries. Areas (in acres) for forested, non-forested land were also manually calculated using dot-grids. It was very important in that era that a cartographer's line work and penmanship be immaculate.

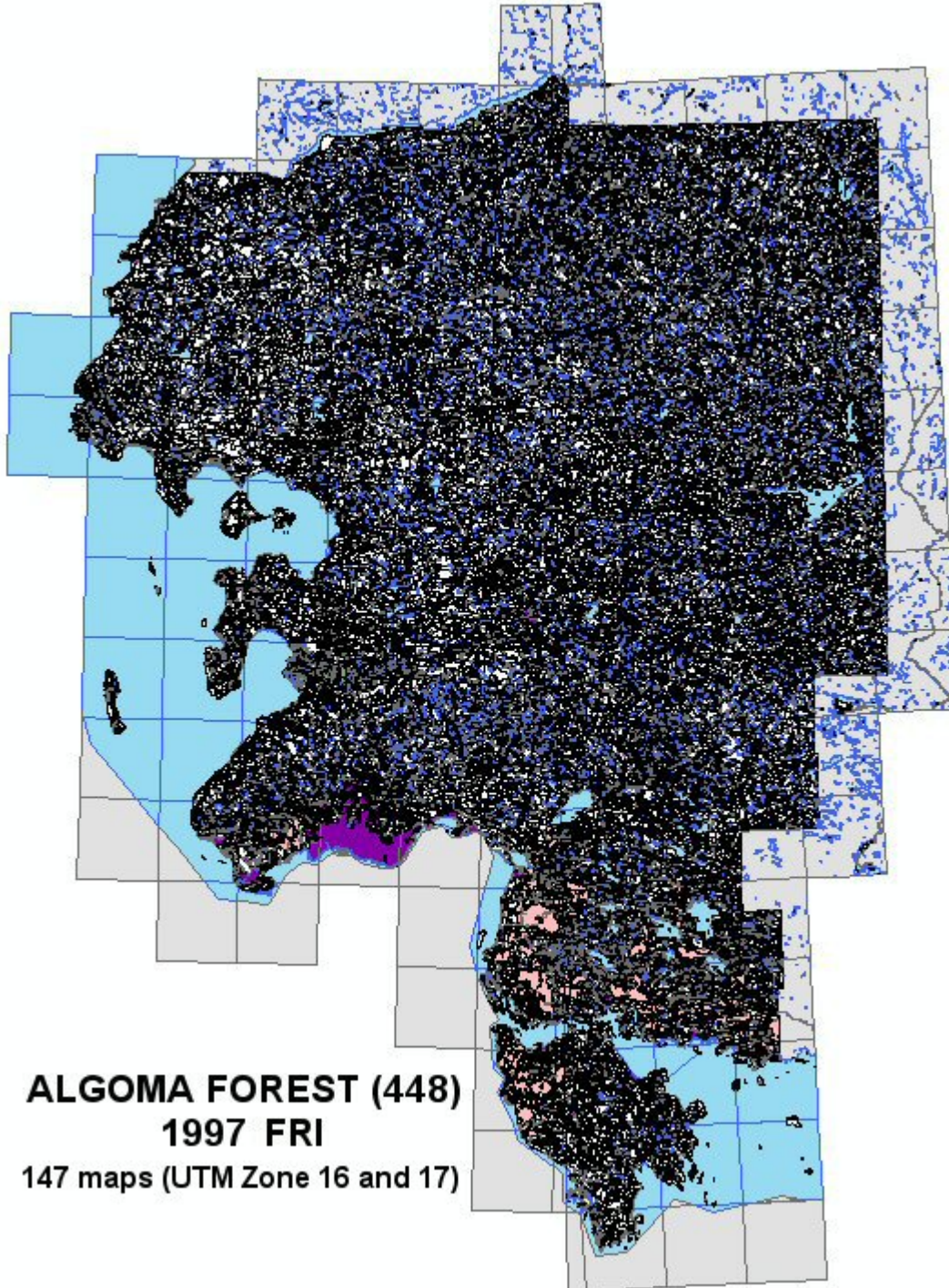


FRI Mapping Technician at work (circa 1960s)

Example of an OBM (tiled) FRI Product

CAVEAT

The data for this version of FRI Packaged Product should be used for comparative historical informational purposes only. GIS Software is required to view this data.



Digital OBM-tiled Forest Resources Inventories were produced by the Ontario Ministry of Natural Resources between 1986 and 2002 in a Geographic Information Systems (GIS)

environment. As the classification implies, the FRI for a unit was partitioned into individual Ontario Basemap (OBM) tiles or workspaces within the Area of the Undertaking, 1:20,000 (10 X 10 km) tiles in Northern Ontario, 1:10,000 (5 km x 5 km) tiles for Southern Ontario. As the tiles are UTM based, Ontario is divided into 4 UTM Zones (15, 16, 17 and 18).

The FRI was mapped and digitized onto the digital OBM base provided by the Provincial Mapping Office (PMO). The FRI Program used or customized the OBM layers into workspace tiles containing the following [ESRI ARC-INFO coverages](#):

FRI Layer	Description
ALLCL	All Centrelines – Road (including forest access roads) and stream centrelines used for buffering Forest layer. Also includes FRI cruiseslines.
ANNO	Annotation layer. Also includes ocular plot locations.
CULTPOINTS	Same as the legacy OBM layer
FOREST	Final partitioned forest coverage which includes ownership and management unit boundaries, with buffered stream and road centrelines.
MU	Management Unit boundary
Neatline	OBM Neatline for the FRI tile.
PFOREST	Primary Forest. Same as forest except that there are no buffered stream or road features as well as no ownership partitioning.
TOWNLINES	OBM Geographic Township, Lot and Concession lines.
OWNER	FRI produced ownership layer which includes patent, federal, first nations, and provincial park lands.
pstanf dbstanf	Forest stand attribute information for the PForest (pstanf) and the georeferenced final Forest layers (dbstanf).

For additional information, refer to the [FRI Database Manual](#) (1996 - Queen's Printer) that is included with the packaged product.

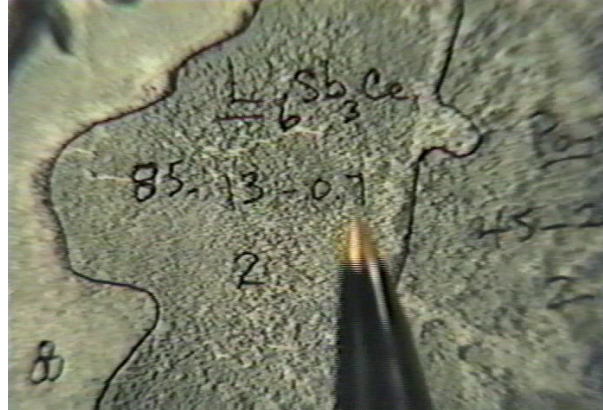
Note: As ARC-INFO Coverages are no longer a supported ESRI product, for user convenience, the above-mentioned coverages will be converted into [ESRI Shapefile](#) format and included in the OBM Tile version of the FRI packaged product.

General Production Overview:

It is interesting to note that for the most part, the basic production tools and methods used to create the FRI remained unchanged since their inception. With regards to the aerial photography, the exception is that the scale had now changed to the standard of 1:20,000 (to match the OBM scale). The Pocket Stereoscope, Vertical Sketchmaster and technical pens were still very much the tools of the trade. As the OBM base was already digital, compilation map plots were generated by GIS Software ready to be used by the mapping technicians once the FRI Drafting Section drafted on patent and administrative boundaries.



Photo Interpretation Specialist Dave Johnston delineating forest stands on a stereo-pair of 1:20,000 scale aerial photographs with the aid of a Pocket Stereoscope circa 1994



Example of a delineated FRI aerial photography. Here, a stand of Eastern Larch (60 %), Black Spruce (30%) and Easter Cedar (10%), 85 years of age, average height of 13 meters, 70% stocked with a Site Class of 2. The stand is next to an open alder swale on the left.

Once the aerial photography was delineated with FRI information, the information was transferred onto the compilation plot by the FRI Project Technician using the Vertical Sketchmaster as seen on the right.



FRI Project Technician compiling FRI map

The map's forest boundaries were edgematched against neighbouring tiles, and each productive forest stand was assigned a unique number. The process of capturing the forest stand attributes was a separate data entry exercise through an FRI-designed database and application.



Forest stand attributes being entered into VAXSTANF database

During the early 1980's and up to the early 1990's, forest stand information was entered into the Forest Resources Inventory Data Entry System (F.R.I.D.E.S) on a Digital PRO-350 workstation. Validated forest stand information for each map sheet was saved onto 5.25" diskettes to be later uploaded to the FRI database on the VAX mainframe.

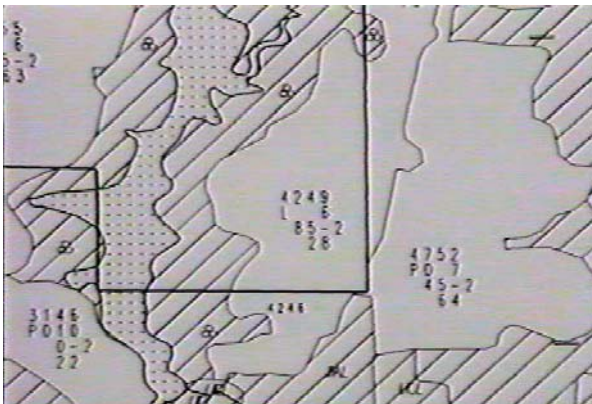
The digital FRI database became the source from which all forest stand summary reports were tabulated and generated. Later developments permitted the data entry of forest stand information directly into the FRI database.

The forest stand boundaries were then manually digitized into an ESRI ARCINFO coverage stored in the map sheet's workspace on the VAX Mainframe using a digitizing table and puck. The subsequent use of a large-format digital scanner considerably shortened the digitizing process.

Forest access roads seen on the photography were also added to the ALLCL layer where they were not present in the associated OBM layers. Ownership and administrative boundaries drafted onto the compilation base plots by the FRI Drafting Section staff were automated into the workspace's OWNER and MU (Forest Management Unit) coverages.



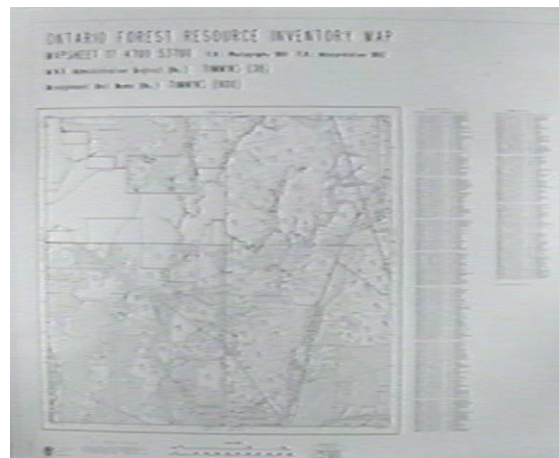
Registering a FRI map sheet on a digitizing table.



A symbolized map plot of the digital FRI

The forest stand spatial and attribute data was then run through a series of in-house created ARCINFO and VAX-VMS quality-assurance routines until the final FRI product was deemed to be error-free. The migration to a UNIX workstation environment in the mid-1990s added processing efficiencies to speed up the digital FRI production process, as did the contracting-out of the majority of the automation efforts.

The completed FRI was then archived; with Mylar hardcopy Forest Stand maps (including 1:50,000 composites), stand summary reports and the digital FRI workspaces delivered to their respective OMNR District and/or Forest Industry partners.



Final Forest Stand map (also known as "Product-1")

Example of a FIM version 1 FRI Product

CAVEAT

The data for this version of FRI Packaged Product is intended for comparative historical informational purposes only. GIS Software is required to view this data. Because the Forest Information Manual Technical Specifications were being developed at the time, the scope of available attributes in FIM 2001 standards (a.k.a. FIM v.1) products does not conform to the attribute structure implemented with FIM 2007 standards (a.k.a. FIM v.2).

Advances in PC processing and storage capacities enabled the FRI to migrate from a tiled-based partition of the inventory, to a unit-wide version. This version of the inventory is essentially an updated OBM tiled FRI unit, where all of the individual map sheet layers have been merged into a unit-wide extent. As such, there is some variability in terms of whether tile boundaries (NEATLINE) are present in the unit-wide version – for some inventories, these boundaries were dissolved.

Forest Information Manual standards defined in 2001 introduced the identification of forest ecosite information and data source as part of the forest stand attribute template. All attributes up to and including SOURCE are required – the remainder are optional at the discretion of the Licensee. The spatial information in this version of the packaged product is in an [ESRI Shapefile](#) format.

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC
1	AREA	8	18	F	5
9	PERIMETER	8	18	F	5
17	PFOR_ALGOMA#	4	5	B	-
21	PFOR_ALGOMA-ID	4	5	B	-
25	STAND	5	5	I	-
30	MAP#	9	9	I	-
39	MNRCD	4	4	I	-
43	WG	2	2	I	-
45	TYPE	2	2	I	-
47	AGE	3	3	I	-
50	YR-ORG	4	4	I	-
54	YR-UPD	4	4	I	-
58	HT	4	4	N	1
62	STKG	4	4	N	1
66	SITE	1	1	C	-
67	SPC	40	40	C	-
107	MODIFIER	7	7	C	-
114	ACT-CODE	2	2	I	-
116	ACT-DATE	8	8	I	-
124	REGION	2	2	C	-
126	PRI_ECOSITE	4	4	C	-
130	SEC_ECOSITE	4	4	C	-
134	PRI-DEPTH	1	1	C	-
135	SEC-DEPTH	1	1	C	-
136	SOURCE	1	1	C	-
137	GEOREFNUM	10	10	C	-
147	FU	7	7	C	-
154	TEMPSTAND	6	6	I	-
** REDEFINED ITEMS **					
126	PRI_ECO	4	4	I	-
130	SEC_ECO	4	4	I	-
39	ALL_ITEM	75	75	C	-

Arc-Info listing of FIM v.1 Field Properties

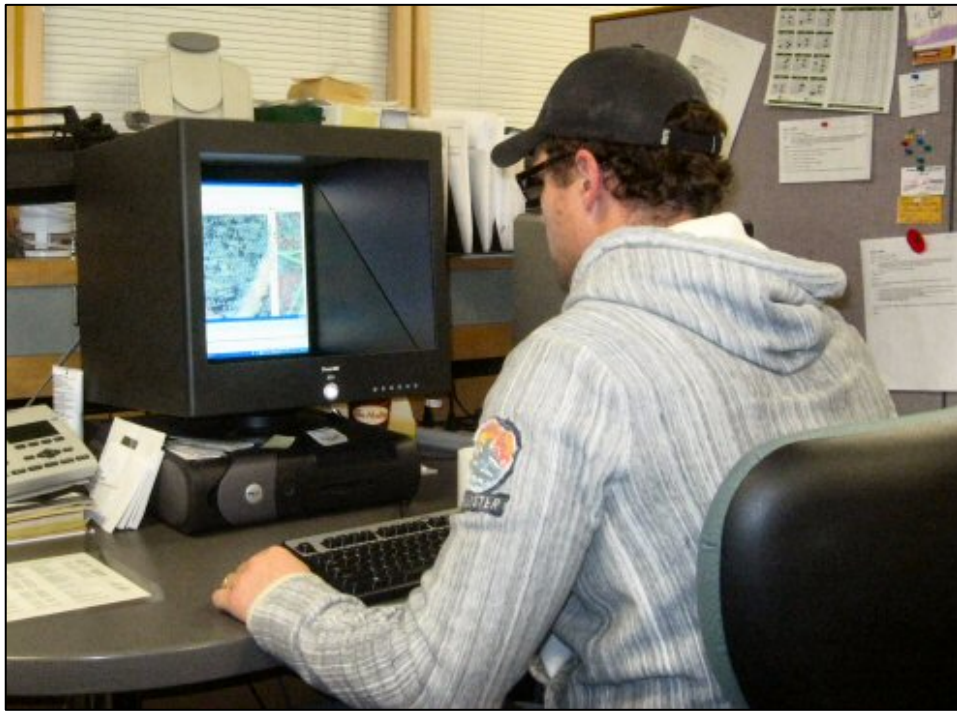
Example of a FIM version 2 (3D) FRI Product

CAVEAT

Specialized GIS Software is required to view this data in 3D.

This version of the Forest Resource Inventory complies with the standards outlined in the Forest Information Manual 2007 Technical Specifications (a.k.a. FIM v.2). The inventory's extent is for the entire unit, and is the standard accepted FRI deliverable provided to clients since 2004.

The 3D version of the inventory allows GIS users to view the forest data in 3 Dimensions (z-scale is stored) using specialized GIS Software and Hardware.



FRI Technician Ed Mick using Stereo Analyst (ArcGIS 9.3) on a 3Di monitor with polarized glasses to view data in 3D.

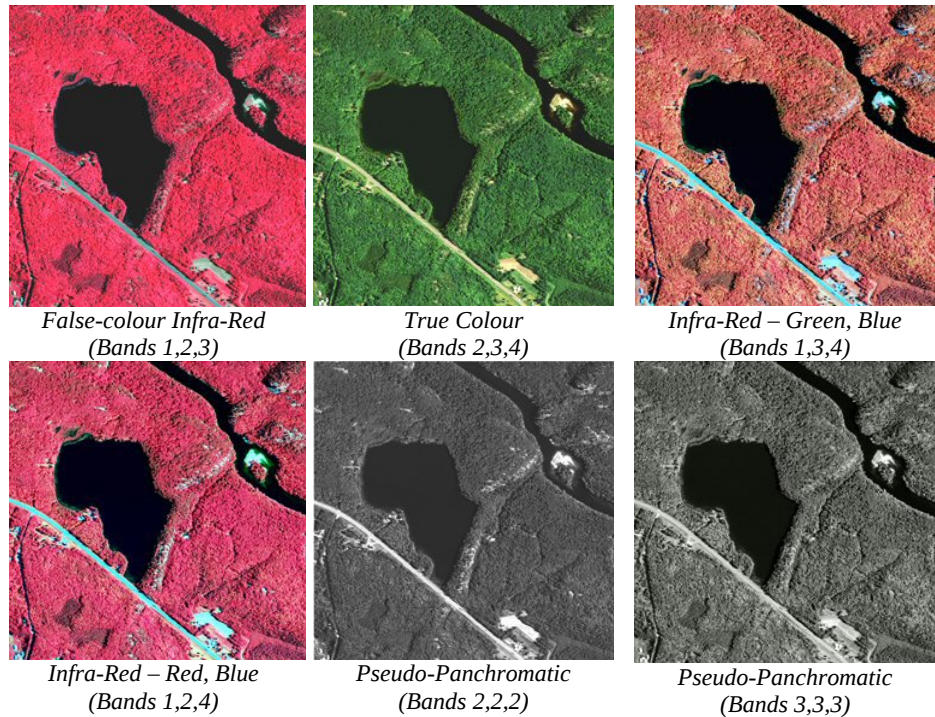
Imagery sources used by FRI Interpretation Specialists for the FIM 2007 compliant (FIM v.2) FRI consists primarily of colour/infra-red photography (4 bands) that is taken in a continuous strip (push-broom) in an inventory unit.

The resolutions and ability to view the imagery in different combinations and ordering of colour bands provide additional insight about the forest landscape to the interpreter while they create the FRI. The Specialists define the forest stand boundaries directly onto the digital imagery, bypassing the traditional need to manually compile/digitize the information as a separate step. Examples of how the ordering and combining of the imagery bands appear to a user are provided on the following page.

Examples of how the ordering and combinations of the colour imagery bands appear to a user.

Legend

Band 1 = Near Infra-Red
Band 2 = Red
Band 3 = Green
Band 4 = Blue



Using specialized hardware and software, the imagery is displayed to the FRI Interpretation Specialist in a 3D environment by serving up reference point data that was captured by the aircraft during the imagery-capture flight (height of land, altitude, aircraft pitch, yaw etc.)

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC
1	AREA	8	18	F	5
9	PERIMETER	8	18	F	5
17	RBC_QUETICO#	4	5	B	-
21	RBC_QUETICO-ID	4	5	B	-
25	FMFOBJID	13	13	I	-
38	POLYID	25	25	C	-
63	POLYTYPE	3	3	C	-
66	YRSOURCE	4	4	I	-
70	SOURCE	8	8	C	-
78	FORMOD	2	2	C	-
80	DEUSTAGE	8	8	C	-
88	YRDEP	4	4	I	-
92	OYRORG	4	4	I	-
96	OSPCOMP	60	60	C	-
156	OLEADSPC	3	3	C	-
159	OAGE	3	3	I	-
162	OHT	4	4	I	1
166	OCCLO	3	3	I	-
169	OSI	4	4	I	2
173	OSC	1	1	I	-
174	UYRORG	4	4	I	-
178	USPCOMP	60	60	C	-
238	ULEADSPC	3	3	C	-
241	UAGE	3	3	I	-
244	UHT	4	4	I	1
248	UCCLO	3	3	I	-
251	USI	4	4	I	2
255	USC	1	1	I	-
256	INCIDSPC	3	3	C	-
259	UERT	2	2	C	-
261	HORIZ	2	2	C	-
263	PRI_ECO	10	10	C	-
273	SEC_ECO	10	10	C	-
283	ACCESS1	3	3	C	-
286	ACCESS2	3	3	C	-
289	MGMTCON1	4	4	C	-
293	MGMTCON2	4	4	C	-
297	MGMTCON3	4	4	C	-
301	VERDATE	8	8	D	-
309	SENSITIU	3	3	C	-
312	BED	8	8	D	-

The completed unit is processed by the FRI GIS Officers and Project Technicians using internally-written quality assurance routines to ensure that the final version of the inventory is error-free and conforms to FIM 2007 (v.2) specifications.

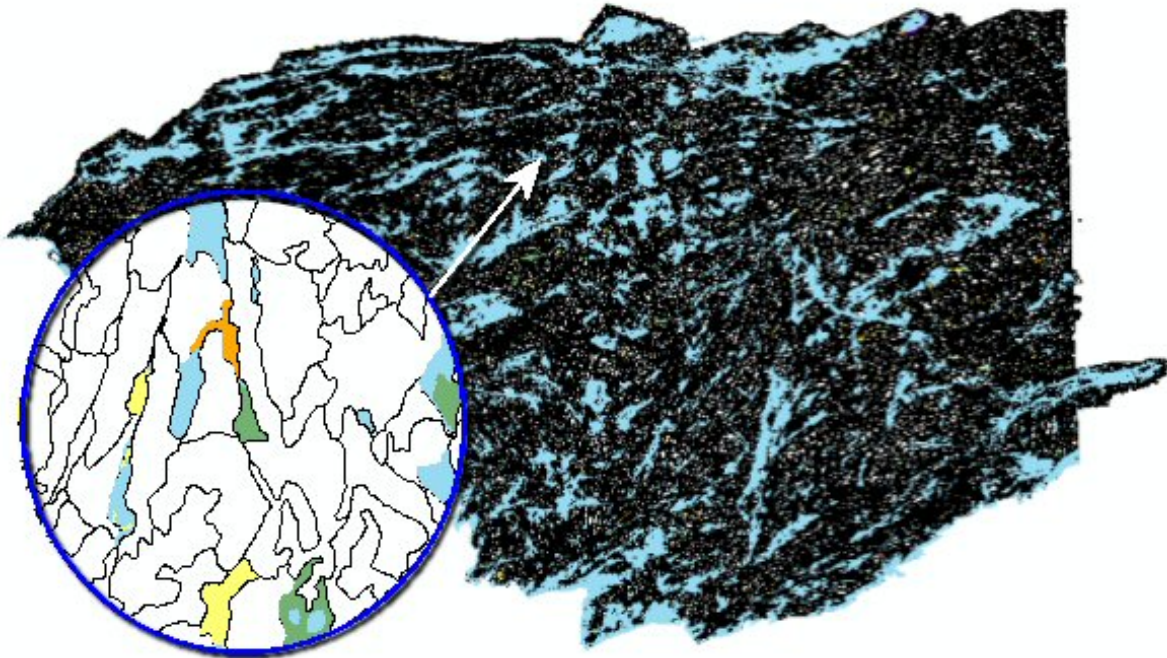
(Left): Listing of shapefile attributes included with FIM 2007 (v.2) packaged products. Documentation about the data structure is provided with the packaged product.

It is important to note that Fields ACCESS1, ACCESS2 (Access Consideration), and MGMT3 (3rd Management Consideration) are left unpopulated by the FRI Program staff for initial inventory delivery. The above-mentioned fields are reserved for Planning Team use only.

Example of a FIM version 2 (2D) FRI Product

CAVEAT

GIS Software is required to view this data.



FIM 2007 (v.2) compliant 2D version of the FRI for Quetico Provincial Park

This version of the Forest Resource Inventory complies with the Forest Information Manual 2007 (v.2) Technical Specifications. The inventory's extent is for the entire unit, and is the standard accepted FRI deliverable provided to clients since 2004. The term "2D" indicates that this version does not store z-values required to view the forest data in 3D. With the exception of not displaying the FRI data in 3D, the spatial layout and attributes for the 2D version are identical to the 3D inventory.

Note: The 2D version of the FRI is used to populate the structured Forest Cover data class (provincial extent) in the Land Information Ontario database.

Planning Composite Inventory Packaged Products

File Naming Convention

The file naming convention for Planning Composite Inventory products is as follows:

pp_FRI_<PI_Type>_<MU #>_<Year>.zip

where:

pp	(hardcoded)	= P ackaged P roduct	
_	(hardcoded)	Underscore separator	
FRI	(hardcoded)	= F orest R esource I nventory	
_	(hardcoded)	Underscore separator	
<PI_Type>	(varies)	The type or version of the FRI Planning Composite Inventory included in the packaged product – listed as follows:	
		PCI	Planning Composite Inventory (Initial)
		PCM	Planning Composite Inventory (Final)
		BMI	Base Model Inventory
_	(hardcoded)	Underscore separator	
<UnitName>	(varies)	The current given name of the FRI Unit.	
_	(hardcoded)	Underscore separator	
<MU#>	(varies)	The Management Unit # of the inventory.	
_	(hardcoded)	Underscore separator	
<Year>	(varies)	Year of Inventory	
.zip	(hardcoded)	file extension for compressed file format.	

The packaged products listed in LIDS would be similar to the examples provided below:

LIDS Display Name	Packaged Product File Name
Martel Forest (509) 2011 PCI	pp_PCI_MartelForest_509_2011.zip
Crossroute Forest (405) 2007 PCM	pp_PCM_CrossrouteForest_405_2007.zip
Abitibi River (110) 2010 BMI	pp_BMI_AbitibiRiver_110_2010.zip

Documentation regarding the data structure is included with each of the Planning Inventory package products.

CAVEAT

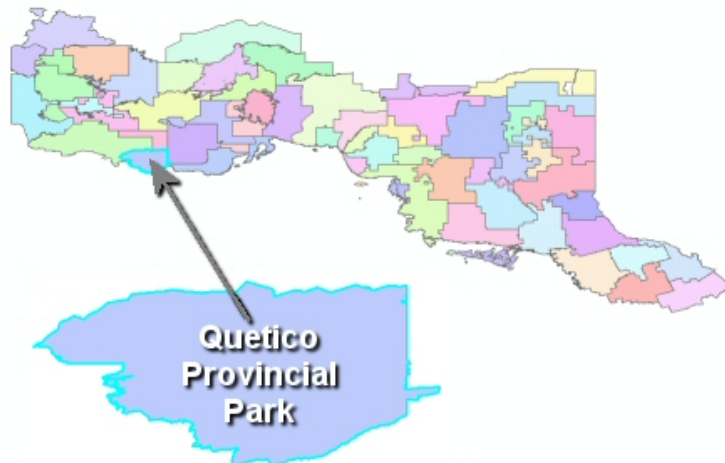
GIS Software is required to view the Planning Inventory spatial data.

Finding the FRI Information in LIDS

The FRI Status layer provides the user with all of the information required about the FRI status and availability of data/products for any given unit. The following example illustrates how a user can use the FRI Status layer to find this information.

Example: A user wants to find out additional information about the Quetico Provincial Park Forest Resources Inventory. By selecting the area in question from the FRI Status layer, the following information is provided:

Below: FRI Status layer showing attributes for the Quetico Provincial Park FRI.



FRI Status Data Class Table

Field	Value
FMF Object Id:	54
Forest Resource Inventory Unit Type:	Provincial Park
Forest Resource Inventory Unit Name:	Quetico Provincial Park
Forest Management Unit Identifier:	PP02
Forest Resource Inventory Status:	Archived
Forest Resource Inventory Status Date:	2009-07-15
Forest Resource Inventory Status Comments:	
Source Imagery Description:	ADS40 - all 6 eFRI Products
Metadata URL:	http://lioapp.lrc.gov.on.ca/edwin/EDWINCGI.exe?IHID=4686&AgencyID=1&Theme=All_Themes
Packaged Product FRI 2D/3D Availability:	3D only
Packaged Product Archived FIMv1FRI Availability:	None
Packaged Product Archived Tiled Forest Resources Inventory Availability:	None
Packaged Product Legacy Forest Resources Inventory Availability:	None
Packaged Product Planning Inventory Type Availability:	None
Planning inventory Update Year:	
Planning Inventory Import Date:	
Additional Comments	

Summary: We are able to determine that the Quetico unit...

- has been archived on the 15th July, 2009 - which means that the data for that unit has been loaded into the structured Forest Cover provincial LIO data class.

- has additional information about the inventory (including source imagery details) that can be found in the official OLID metadata record through the URL provided.
- has only a Packaged Product available for the 3D version of the Inventory.
- does not have any Planning Inventory packaged products currently available.

In this example, the user is interested in the 3D version of the FRI. To find additional details the user would open the associated Packaged Product FRI Catalogue child table to see what packaged products are currently associated to this unit.

FRI Packaged Product Catalogue Table

Field	Value
FRI Status Map FMF Object Id:	54 (Quetico Provincial Park)
Packaged Product Display Name:	Quetico Provincial Park (2009) FIMv2(3D)
Forest Inventory Type:	FIMv2(3D)
Historical Unit Name:	
Inventory Vintage:	2009
Packaged Product File Name:	pp_FRI_FIMv2_3D_QueticoProvincialPark_2009..zip
Packaged Product Comments:	This 3D dataset is intended for use in specialized software and hardware such as Stereo Analyst with 3D glasses. The Z component of the spatial dataset are used to reproduce the 3D terrain model when coupled with the Stereo Imagery.
Packaged Product Upload Date:	2010-03-10

Using the information provided, the user can log into their [Land Information Data Subscription](#) (LIDS) service account to place their order as they now know what Forest Resource Inventory products are available for that particular area of interest (Quetico).

LIO Warehouse

Land Information Data Subscription Service

Please Login:

User Id:

Password:

OK

Forgot Password

And create a new order for either the Structured Products (data classes) or Packaged Products suite.

LIO Warehouse

Land Information Data Subscription Service

Product Select Menu

Please choose from the following product types:

1)

Structured Products

2)

Packaged Products

Back

This site produced by the Ministry of Natural Resources

[Central Site](#) | [Feedback](#) | [LIO Home](#)

1) Structured Products Suite – a user would choose ‘Forest Cover’ from the list, and then use the ‘Restrict by Geography’ option to limit the geographical area to the Quetico

Provincial Park. This step is necessary because the Forest Cover data class is provincial in its geographical extent.

New Order for OGDE

Available Structured Products:

Fish Culture Operation, MNR	Add -->	
Fish Pathogen Management Zone		
Fish Pathogen Management Zone Boundary Source		
Fisheries Management Zone		
Forest Abiotic Damage Event		
Forest Cover ←		
Forest Disease Damage Event		
Forest Insect Damage Event		
Forest Management Unit		
Forest Misc Damage Event		
Forest Processing Facility		
Geographic Name Extent		
Geographic Township		
Geographic Township, Improved		
Granulite Facies		

'Size Restriction' refers to a class where extracts for the entire province are not permitted. Please use the Restrict by Geography option when ordering.

2) **Packaged Products Suite** – a user simply needs to choose the desired product(s) from the list of available one. The FRI packaged products are created and named according to their geographic extent and type (i.e. 2D or 3D).

LIO Warehouse

Land Information Data Subscription Service

New Order for OGDE

Available Packaged Products:

Floodplain Hazard Land Mapping - Ontario	←
Quetico Provincial Park (PP) 2009 FIMv2(3D)	
GTA_ORTHOPHOTO_1995_L1	
Great Lakes - St. Lawrence Basin Watersheds - OWRA	

Select delivery method:

(Note: Files larger than 325 MB will automatically be shipped)

- ☒ Download
☐ Shipped

Choose a method for selecting packaged product files:

- ☐ Product File List (Classic Interface)
☒ Product Tree

Back Next Cancel

Where available, Packaged Products for Planning and Pre-FIM inventories (digital and legacy) can be found using the same methodology. The respective file naming convention for these packaged products can be found in this user-guide.

Once the user selects the desired datasets, they follow through the guided steps until their order is completed and instructions are provided to select a delivery method (e.g. DVD, direct download).

Where possible, additional metadata/product-specific guidelines will be included with each packaged product to help the user better understand the data.

