

Manitoba's Elevation (LiDAR) & Imagery Datasets

"Acquisition Plans & Opportunities for Collaboration"

Manitoba Planning Conference May 2017



Presentation Outline

Manitoba's Elevation (LiDAR) and Imagery Datasets GOM Planning and Applications Acquisition Plan(s) to Update Datasets Examples of Collaboration

Questions



Elevation Information

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Current Digital Elevation Model Datasets

- Shuttle Radar Topography Mission (SRTM): 90m DEM
- Collected in 2000
- Horizontal accuracy <=20m
- Vertical accuracy
 - Absolute <=16m
 - •Relative <=10m



Current Digital Elevation Model Datasets

- Southern Manitoba 100m DEM
- Published 2002
- Derived from 2m Orthos,
 supplemented with 50 000 NTS
 contour lines
- Horizontal accuracy <=100m
- Vertical accuracy <=3m



Current Digital Elevation Model Datasets

- Ortho Refresh derived 15m DEM
- Collected 2007-2012
- Horizontal accuracy <=1.5m
- Vertical accuracy <=1.5m



Ortho Refresh Digital Elevation Model (DEM) -Manitoba

Value High : 831.759

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Low : 207.127

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Needs and requirements

Elevation data is essential for many applications:

- Flood Plain Mapping and Mitigation Strategies,
- Surface Water Management,
- Infrastructure Development/Management,
- Disaster Management and Recovery
- Most of these applications now require base data with greater resolution, (starting with imagery and elevation information).



2011 Flood Demonstrated Need for Enhanced Elevation Information



Lake St. Martin LiDAR will enable:

Mapping of sites for land exchange with First Nation

Investigation into emergency reduction of Lake Manitoba and Lake St. Martin levels

Flood mitigation

Hydraulic modelling

Defining the Lake St. Martin and Dauphin River Financial Assistance Program area

Lake St. Martin First Nation: June 23, 2011.



LiDAR-Elevation Information

- Light Detection And Ranging
- Laser pulse emitted and the time it takes to strike an object and return is measured.





LiDAR Advantages

- High accuracy
- Fast acquisition and processing
- Minimum human dependence
- Light independence: day/night collection
- Canopy penetration
- High data density (3D data)



LiDAR Data-GOM Applications

ROSEAU RIVER WATERSHED DISTRIBUTED RETENTION STUDY



Manitoba



Potential Retention Storage Assessments using Lidar data



Potential Water Retention Sites in Roseau River



Potential Water Retention Sites in Cooks Creek Watershed





Transportation











Forestry







Community Planning-Subdivisions



Traverse Bay: Lake Winnipeg November 2009





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Flood Extent 1950, 1997, 2009 & 2011







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2 Homes

Aerial Photography + LiDAR = Powerful Tool in Flood Preparedness



RL 632 AG Via Flood Liaison Offices Approx 1997 Level: 773.4 ft Elevation Information:

• 2009 flood imagery

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• 1997 flood level

Sample of information

provided to landowners

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Opportunities for Collaboration





LiDAR Capture Partnership

Cooks-Devils Creek Watershed

RM Springfield RM Tache Cooks Creek Conservation District Province of Manitoba



Public Safety Canada's National Disaster Mitigation Program



Manitoba



- 50/50 Federal/Provincial funding to "reduce the impacts of natural disasters on Canadians".
- Under this program there are 4 funding streams; risk assessment, flood mapping, mitigation planning and non-structural and small scale mitigation projects.
- Currently there is a signed Contribution Agreement for flood risk mapping which includes hydrologic and hydraulic analysis, data capture.





2 yr LiDAR Contribution Agreement







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2017 Proposed LiDAR Acquisition Seine and Rat River Watersheds

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Seine and Rat River Watersheds-Possible RM & CD Partnerships



Model 1: Municipality Area Based Calculation

Model 2: Crown vs Private Assessment on Total Cost

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Model 3: Crown vs Private Assessment where province pays 100% on crown lands plus 50% on private



Imagery Datasets-Ortho-Photography



Air Photo Library Past and Future

•Prevents deterioration of negatives and photos from handling and age

- Decreases search time
- Increases staff efficiency
- •Georeferencing photos
- •Negatives scanned at 1200 dpi.
- Each roll takes a minimum 30 hours scanning time up to 7 days.









•1500 rolls of negatives in storage



Manitoba Orthophoto Program



- 1991 1998
- Grey scale
- 2 metre resolution



Manitoba Ortho Refresh Program



- 2007 2014
- •\$1.2 Million
- True colour
- 50 cm resolution

•Partnership- 6 Departments, Crown Corporation, Federal Government and Forestry Industry

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Manitoba Ortho-Photography



1997



2009





Imagery Acquisition- 2 Options Under Consideration









High Resolution Optical Imagery Acquisition









Satellite Imagery Benefits

Coverage

Cost

Frequency of data capture



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Canada: 9,984,670 square kilometres

esolution	AB	BC	MB	NB	NL	NS	NT	NU	ON	PE	QC	SK	ΥT	Total
30cm		628,854	232,552	71,356		52,917	3,269		127,777		1.254			1,116,725
50cm			417,501					224,458	530,411		471,158		262,000	1,905,528
1.5m	650,262	457,199	1				,141,551	294,112	337,858				221,000	3,101,982
5m							208,955	1,752,629			1,209,341			3,170,925
Total	650,262	1,086,053	650.053	71,356		52,917	,353,776	2,271,199	996,046		1,680,499		483,000	9,295,161



NATURAL RESOURCES CANADA - INVENTIVE BY NATURE

High Resolution Satellite Imagery-Next Steps

Confirm and Finalize Imagery Specifications Finalize RFP and Tender Assessment Criteria Confirm Funding

Possible Fall Release





Natural Resources Ress Canada Cana

Ressources naturelles Canada



Option 2 Multi-Year Ortho Photography Program





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Option 2 Orthophotography Renewal Project- "Southern Manitoba"

- Manitoba Geospatial Information Committee (MaGIC)
- Determined Area of Interest & Target Start FY 2018-?
- Updating Ortho Specifications
- Communication-Preparing Orthophotography Fact Sheet
- Investigate Collaboration and Partnership Opportunities
- Develop Acquisition Strategy, Determine Costs, RFP, etc.



Summer/Fall Decision





Manitoba Land Initiative-Open Data

- Cross-department partnership
 project
- Database of government's land related information
- Accessible by public and government agencies
- Over 20,000 registrants

Manitoba Land Initiative

The MLI website is currently being transitioned to a new host. Please update your bookmark to <u>http://mli2.gov.mb.ca/</u>.

In order to access the Data Warehouse, you must be registered. Please register now if you have not previously done so.



Digital Maps



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Register Help

Enabling access to geo-spatial information from the Government of ManitobaTO YOUR DESKTOP! The Manitoba Land Initiative Web site is the source for geo-spatial information from the Government of Manitoba. It is intended for both the GIS expert and the decision maker. This Web site allows on-line access to the MLI corporate land data warehouse. Please, click on <u>Contact Us</u> to let us know what you think - and how we might improve this site.



If you have previously registered to access Core Data, you can gain access to the site by selecting the Download Digital Maps link.

If you have not previously registered, you will be asked to read and accept the <u>User</u> <u>Agreement</u>. You will then be asked to provide some detailed information about yourself. You will be asked for your E-Mail address, a user ID and a password. The user ID and password are case sensitive.

This user information is being collected to monitor user activity statistics to assist in the ongoing maintenance and integration of new datasets into the site.

Go!

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Manitoba Land Initiative-Open Data

MLI - home digital maps metadata contact us

Search

Manitoba Land Initiative

Download Core Maps

About Admin. Boundaries Base Maps <u>Cadastral</u> **Digital Elevation Models** Digital Imagery Environment Forest Inventory Geographical Names Geology Mapping Hydrography Land Use/Land Cover Municipal Maps Quarter Section Grids Soil Classification Spatial Referencing Topographic Maps Town & Village Plans Transportation Comments

Map Servers

Interactive Maps

Related Sites





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Manitoba Land Initiative

Core Maps - Data Warehouse

About

The **Core Maps** - **Data Warehouse** provides a set of provincial base map products that meet a broad range of digital mapping and Geographic Information Systems (GIS) needs. All core maps are available in several formats (see table below) and come with metadata. The "**Interactive Maps**" option on the bottom left, provides access to a number of servers and their larger seamless datasets.

All coordinates are in the NAD83 UTM projection Zone 14 or EPSG:26914 unless noted otherwise. The use of data from the Data Warehouse is subject to the terms laid out in <u>"Terms of Use"</u> agreement.

<u>Revisions</u>	2012/05/01	numerous item(s)	additional datasets and changes
<u>Data Standards</u>	2009/09/15		
<u>In the Works</u>	2010/11/08		some projects currently being worked on
<u>Events</u>	2012/02/22		GIS events

Registered users: 2007/03/20 - 9555 2008/07/15 - 11,770 2011/05/09 - 16178 2012/02/23 - 17414

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Please click on Comments to give us your ideas or suggestions on how we might improve this site

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MLI Sample Datasets

- Provincial Boundary
- Municipal Boundaries
- Parks and Park Reserves
- Protected Areas
- Soils
- Forest Inventory
- Cadastral
- Quarter Section Grids
- Digital Orthophotos
- LiDAR







Questions?

Imagery Acquisition LiDAR Acquisition

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