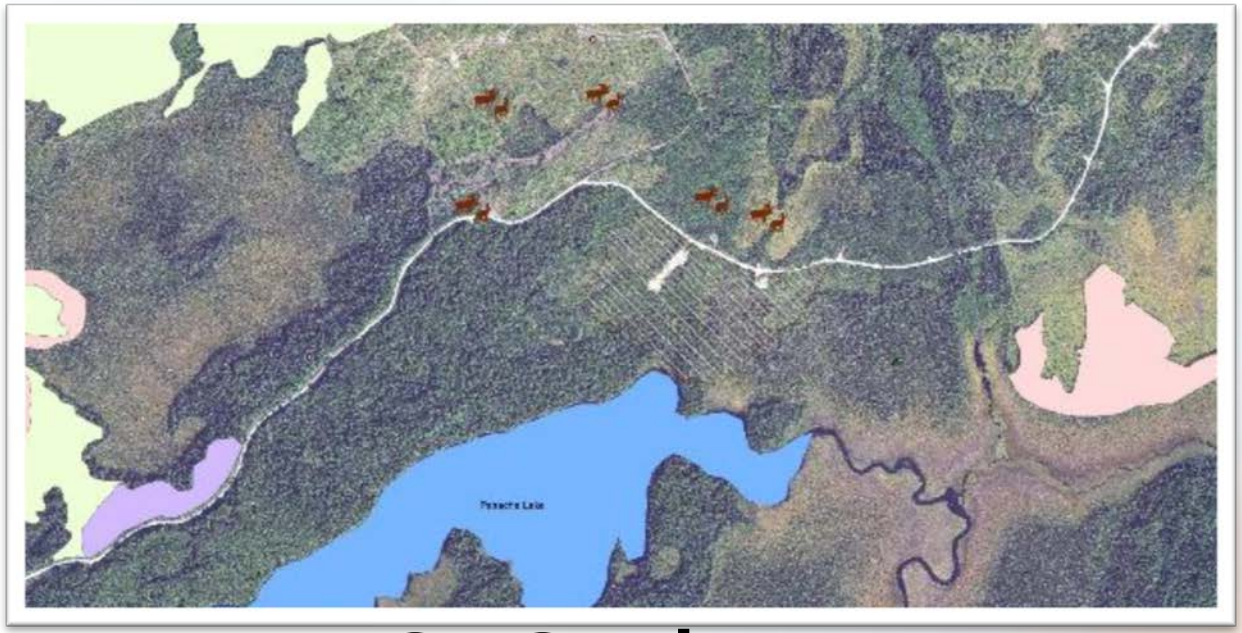
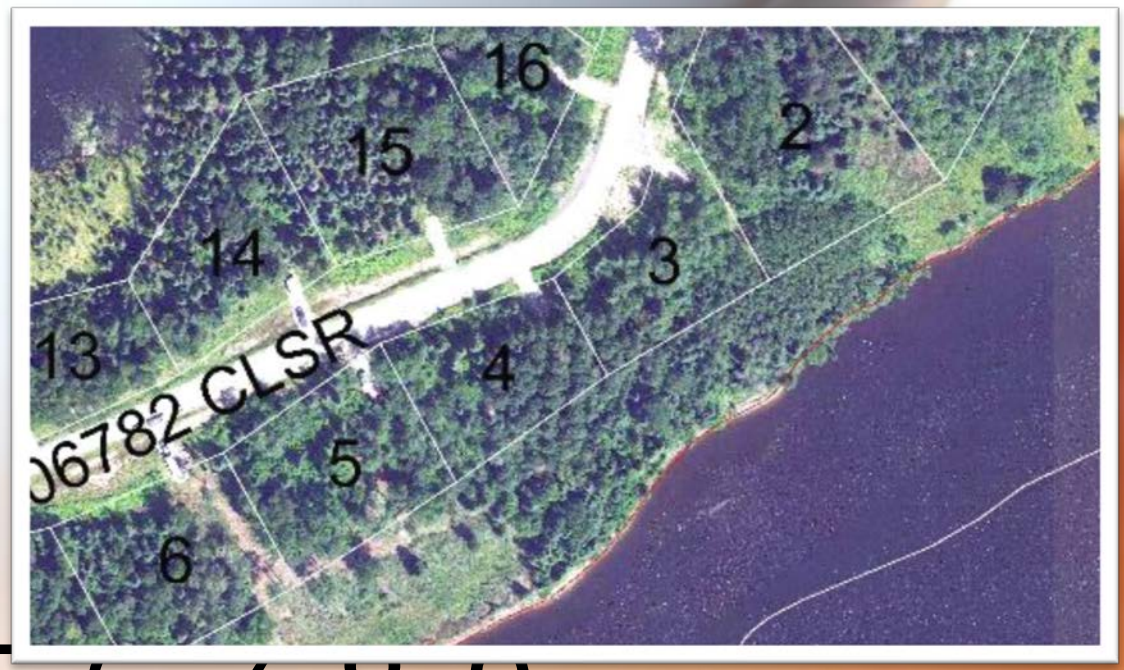
Geographic Information System Implementation

Issues and Opportunities





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FIRST NATIONS LAND MANAGEMENT RESOURCE CENTRE

Presentation Overview

- Community Background
- My Background
- Community Need
- Power of GIS
- Original Ontario Driver
- Cultural Resources Mapping Project
- What is GIS?
- GIS Implementation: Strategic Planning Steps
- Knowledge Centre
- Moving Forward: Geospatial Extension

StoryLine

Two reserves were established for the Lac des Mille Lacs First Nation in 1873. Reserve 22A1 (noted as farming lands at the signing of the Treaty), and Reserve 22A2 (noted as wild lands at the signing of the Treaty).

The Rebuilding of a Community

In 2005/06 the First Nation took the first step in returning to their lands with the construction of an Access Road through Crown Lands to Reserve 22A1.

Cornerstones Established

- ✓ Governance Policy
- ✓ Membership Code
- ✓ Housing Policy

October 30, 1873 the First Nation signed Treaty #3 by the Shebandowan Adhesion

By 1944, many Lac des Mille Lacs families were forced to leave the reserve because of the flooding

Forced Abandonment

DALLAN

Savanne River Resort

Economic Renewal Begins

In 2012, the construction of a Roundhouse was the first community building built for the re-development of the community. The Community Cultural Centre was built in 2014/15.

Treaty Signed

1873 | 1867 - 1955 | 2005 - 2019

The Flooding

In 1923 the Backus dam was built in the same location as the Dawson dam.

Roundhouse / Cultural Centre

Between 1867 and 1876 Canada dams constructed for its first major development project by constructing the Red River Road.

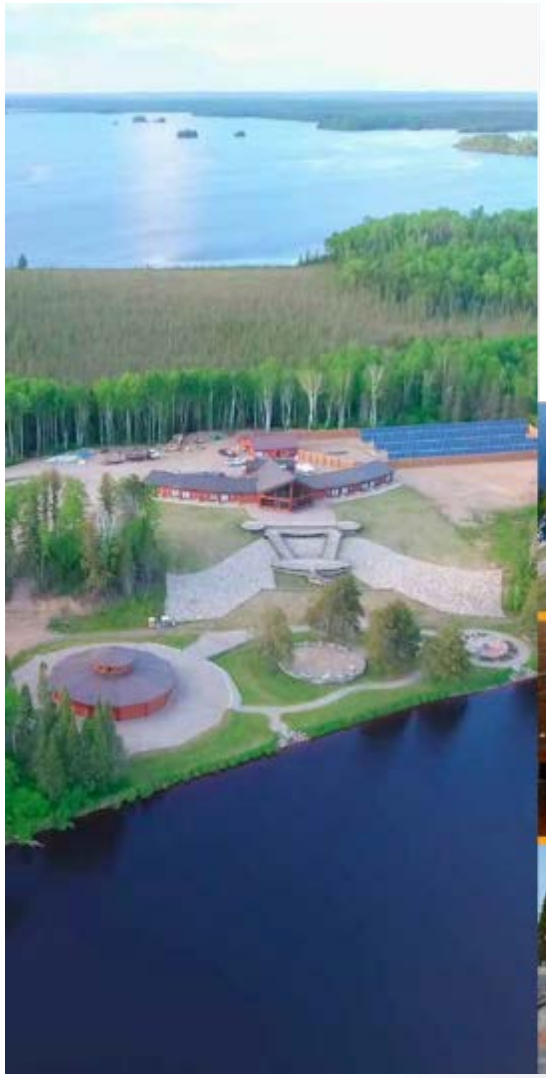
In 1955, Ontario replaced the Backus dam with a concrete dam designed by Ontario Hydro,

Canadian Solar Association's 2017 Game Changer

2019 Electrification of the Reserve with Marine Cable Installation

Community Backgrounds

Nezaadiikaang
(Lac des Mille Lacs First Nation)



- In 2012, the construction of a Roundhouse was the first community building built for the re-development of the community. It is a structure that represents who we are as a People both spiritually and culturally. The Roundhouse is used for spiritual ceremonies, teachings, training sessions, and community meetings.

- A Community Cultural Centre was built in 2014/15 to provide overnight and short stay accommodations for the Elders and their families. This provided an avenue for the people to come home and visit the land during the spring, summer and fall months. During the winter months the centre hosts retreats, meetings and seminars for a variety of organizations.

- It should be noted that the Roundhouse and Cultural Centre projects were completed by LDMLFN without any financial support from any government program.

Model and innovative programming to promote social growth and well-being.

Social Programs

Protect, preserve and promote our cultural identity and knowledge including language, traditions. customs, land use management principles.

Culture

Sustainably managed through stewardship, adaptable management and planning.

Environment

Governance

Strong core administration policies and programs that are transparent, integrated and Independent.

Education

Education Centre

Cultural Teachings of the Land & Ways of Life / Academic Programming

Economy

Create the right conditions and partnerships that will provide financial security to our Nation which will allow us to provide top-tier programs and services and rebuild our community.

Moving Forward

- Our ability to develop relationships and partnerships with municipal, provincial and federal governments, industry and other First Nations will lead us to change the usual way of thinking and replace it with new and better ways.
- Together we can design and build a model sustainable Indigenous community through the identification and establishment of strong economic development and employment opportunities.
- It is through the "identification of opportunities" that we can create a vibrant economy by attracting investment, lead and capture business ventures, stimulate economic growth, and support membership to access the required skills and education to be successful.

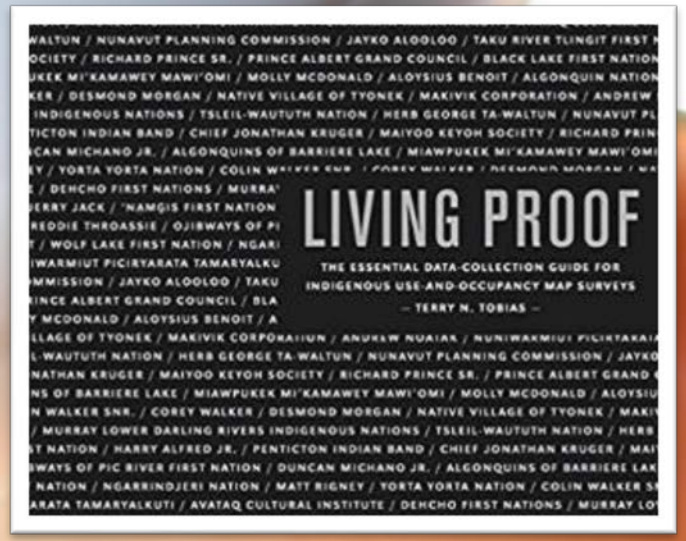
We can "**Aim Higher and Achieve More**" by working together to create the proper economic conditions that will provide the community greater self-sufficiency and wealth accrual.

My Background

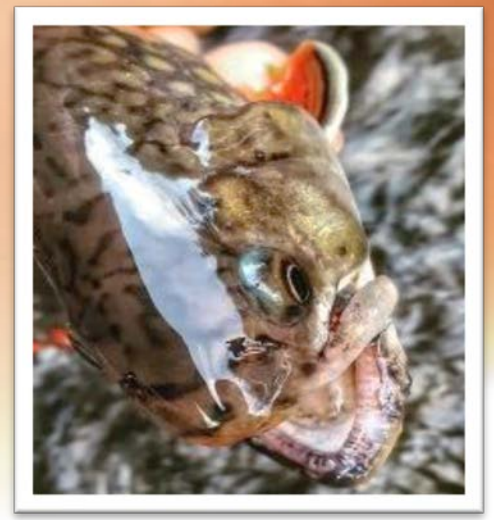
- Graduated in GIS in 1990 (Confederation College).
- One of the first using GIS in NW Ontario: even prior to Provincial implementation.
- Worked for a survey firm within municipal applications such land use, zoning, and COGO.
- I993 – 2009 worked for an Indigenous NFP to raise First Nation participation and knowledge in forestry and resource development supported by the use of GIS.
  - Award of the 2001 Conservation Technology Support Program.
  - Recipient of the 2005 Esri Award of Excellence
- 2009 Certified GIS Professional (GISP) from the GIS Certification Institute. Met the minimum standards for education, experience, ethical conduct and professional practice as established by the GIS Certification Institute (GISCI).
- Currently, work with LDMLFN to support resource development, business initiatives, land management, capacity building, **GIS Program**, etc

Community Need

➢Recognized community need for the implementation of information technology to document, map, manage, protect and promote cultural and landscape knowledge through the use of GIS;



- Preserve, promote and protect community knowledge
- Build community capacity to participate within land use planning and development through the respect and application of Indigenous Knowledge;
- Pro-actively ensure community knowledge, values, information and interests are represented, understood and appropriately shared.
- Utilize a consistent, standardized, and reliable collection method;
- Assist as a tool to educate youth, and where applicable governments, industry and the general public about the community history, use and the connection to the landscape.
- Develop corporate use of the relevant technologies;



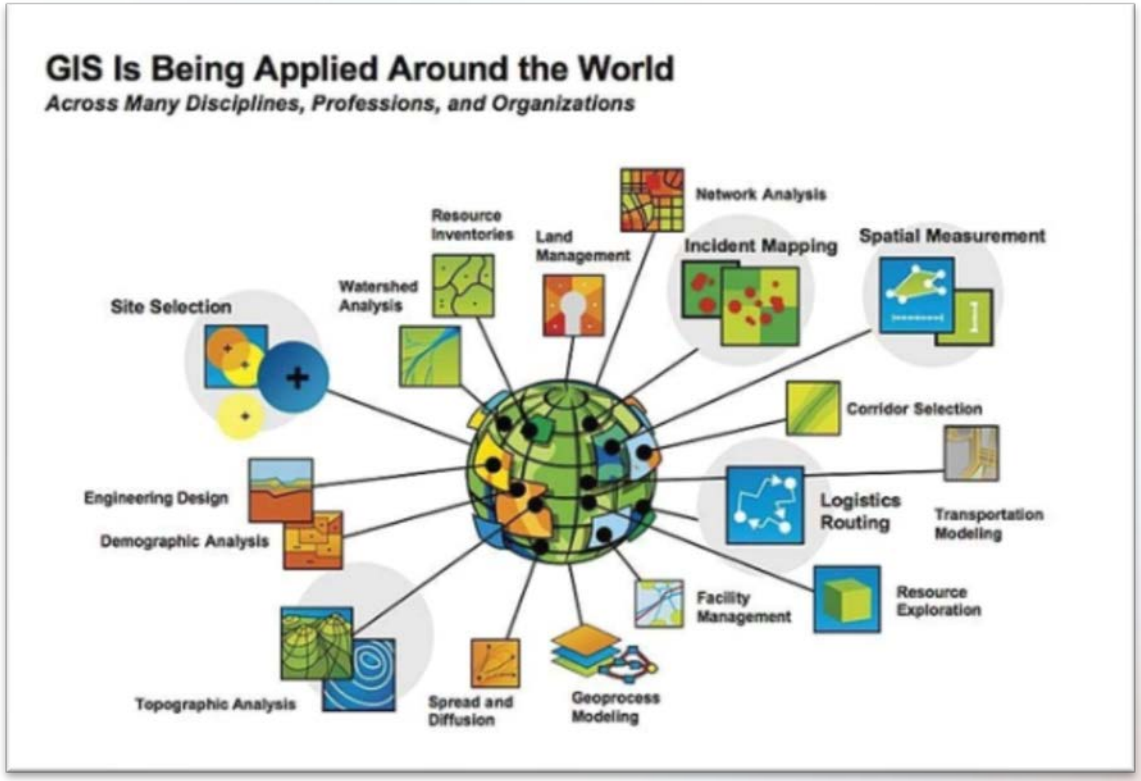
The Power of GIS

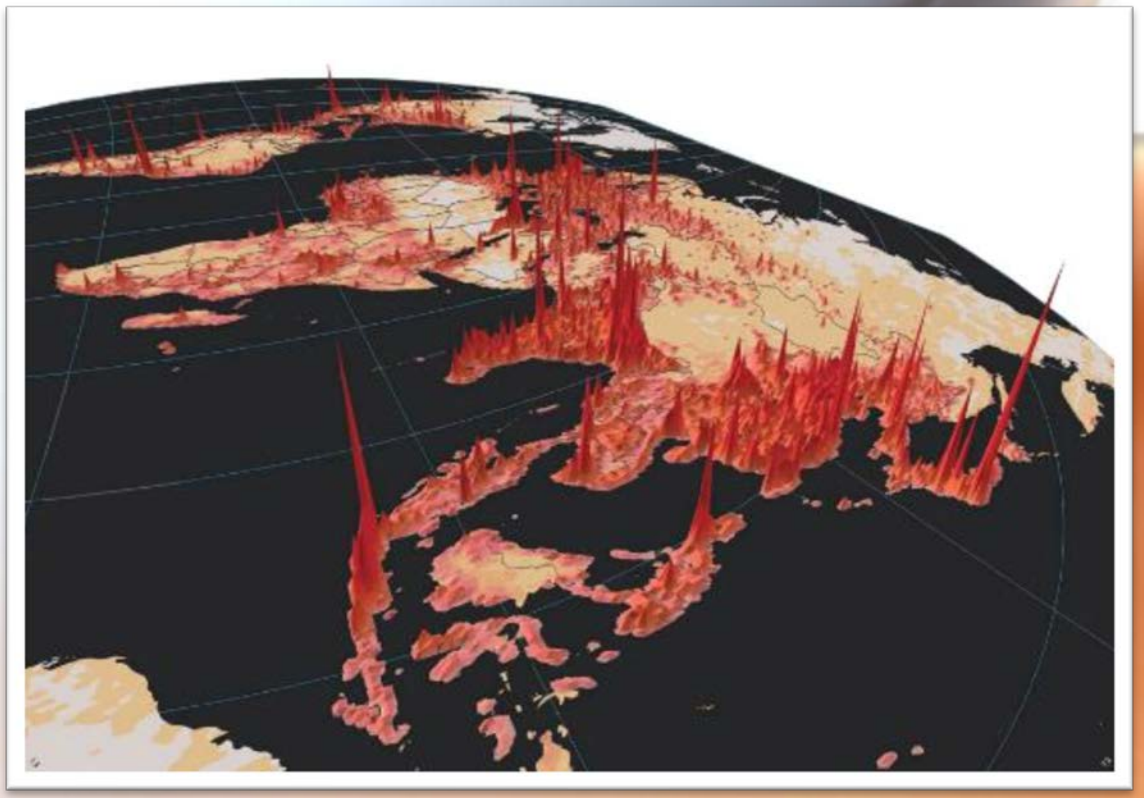
- GIS is used in many ways by many organizations, government departments, industries, etc.

- It provides a visual representation of information and analysis that only GIS can provide, resulting in a Wide Range of Benefits including;

- ✓ **Spatial Mapping**: the power of mapping cannot be ignored: GIS allows the user to understand what has happened, what is happening and what will happen in a geographic space, which then enables them to take action.
- ✓ 2. **Real time information**: Once implemented, GIS can provide a wide variety of information and incorporate real-time data into your decision-making process. Where are all the vehicles in my fleet at this moment? Where is my delivery?
- ✓ 3. **Informed Decisions**: Better decision making based on locational information from site selection to route choices, evacuation planning and more.
- ✓ 4. **Improved Efficiency**: Many utilities use GIS to optimize maintenance schedules and fleet movements, saving operational expenses through reduction in fuel use, staff time and more efficient scheduling.
- ✓ 5. **Better Communication**: Visual maps and charts reduce the likelihood of misunderstanding and improve communication and collaboration between different teams, departments, organizations and even the public.
- ✓ 6. **Better Records**: GIS provides a strong framework for managing and maintaining records about the status and change of geography with full transaction support and reporting tools.

The Power of GIS





Original Ontario Driver: Forest Management Planning

- Indigenous Knowledge collection in Ontario had mainly driven by the requirements of the Forest Management Planning Manual under *Section 1.4.6 Native Background Information Report.*

- Overall this approach has provided varied results and many problems for the Province and First Nations.

- These problems created knowledge gaps, poor communication, bad relationships, incomplete planning and vanishing traditional knowledge.

Cultural Resources Mapping Project

Cultural Resources ("CR") includes the knowledge and values, which have been acquired through experience, observation, use and occupancy, and management of the land or from spiritual teachings, and handed down from one generation to another amongst the people of Lac Des Mille Lacs First Nation. CR also includes beliefs, practices, innovations, arts, spirituality, and other forms of cultural experience and expression that belong to the people of Lac Des Mille Lacs First Nation.

The project objectives are to:

- ✓ Build LDMLFN technical capacity and skills to use GIS to collect, map and manage cultural values, traditional ecological knowledge and environmental information;
- ✓ Design and implement a community-based process to document and map cultural and natural knowledge including the appropriate permission forms and interview questionnaires;
- ✓ Establish protocols to enable use of community knowledge and information, community values, and community land management perspectives in decisions related to the land;
- ✓ Enable LDMLFN to better engage and participate and support planning and management of the land including joint stewardship initiatives and co- operative decision-making.

Cornerstones

- **Principles**
  - LDML must always retain ownership of the information collected, it is communmity **intellectual property** and that must always be protected.
  - **LDML controls** how the knowledge and information is shared and to whom it is shared with.
- **Approach**
  - Collection is based on a cooperative **human approach.**

    It is not a technology approach.
  - Process is based on **friendships** by incorporating communication and trust as key elements.
  - Established a **Common Ground** between traditional knowledge and technology that guides the course of this work.

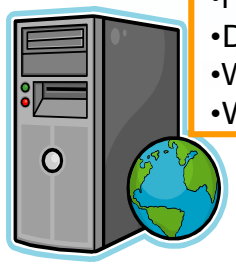
GIS conversion and map making process can de-humanize the personal interactions and knowledge that community members have of the land and each other. Coloured lines, points and areas on a map can also de-sensitize the end user to the long term personal relationships, hardships, emotions and experiences from the person whose knowledge created the map.

What is GIS

Think of a GIS as data managed and represented as many layers of information on top of and underneath each other. There are many ways to display and map geographic space, time and events associated with this information.

1. Hardware

- Digitizer
- Global Positioning Systems
- Printers & Plotters
- Digital Cameras
- Workstations
- Web servers



GIS CHAMPION: The existence of a champion within the organization is strongly related to the successful implementation and effectiveness and adoption of GIS technologies.

2. Software

- Creates, edits, analyzes and serves information
- Many packages of varying degrees of functionality & costs (Esri ArcGIS Platform, Mapwindow

4. People

Skilled
Knowledgeable
Dedicated

3. Data

- **Geographically Referenced** Locations on the earth grouped into points, lines, polygons and raster.

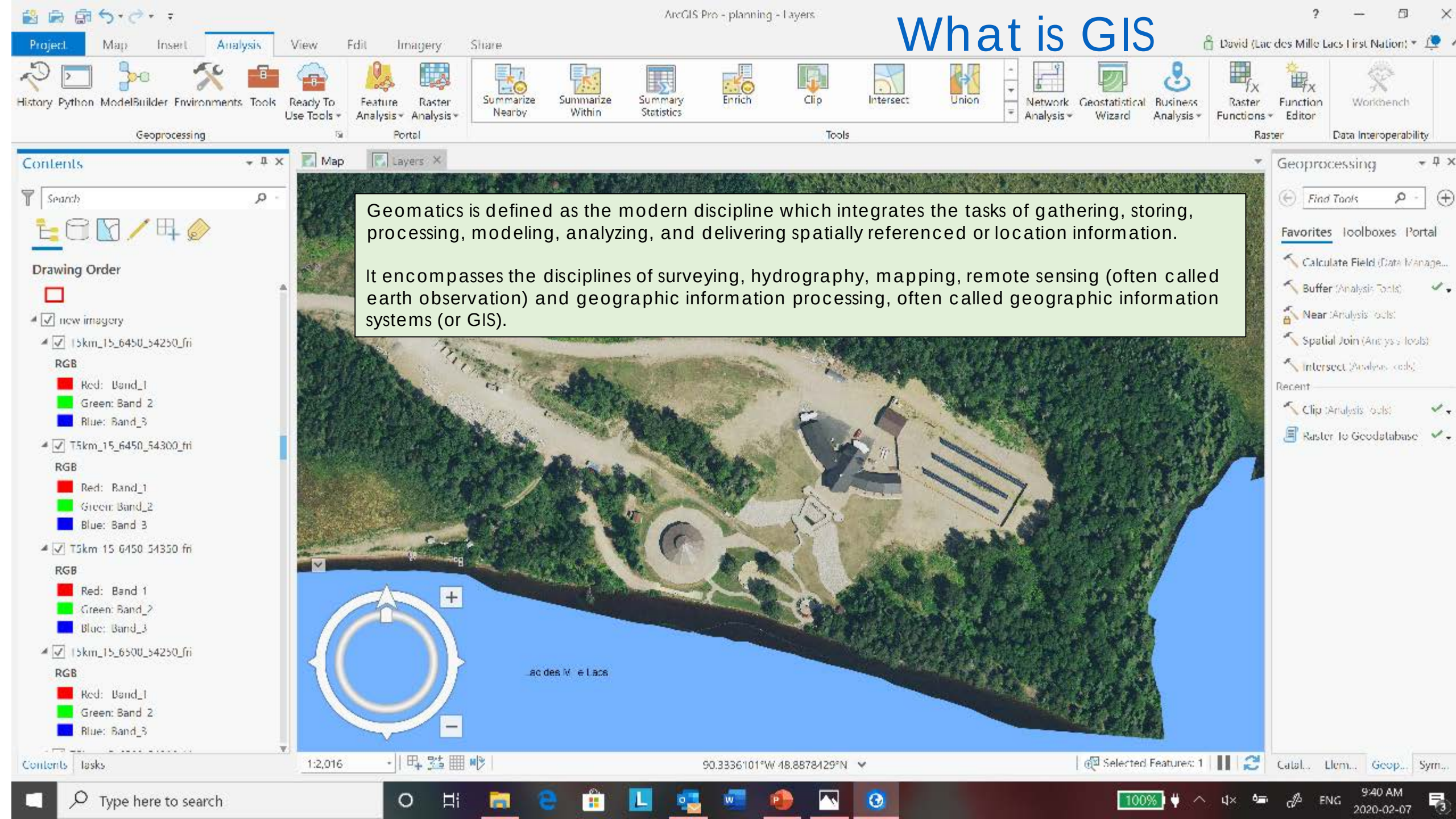
- Ontario GeoHUB / Geospatial Data Exchange (OGDE)
- NRVIS
- Canada Lands Survey Records
- Web Mapping Services (WMS)

Attribute additional information which provides details about points, lines or polygons.

(A Lake can be represented as a polygon and area, perimeter and name are attribute data)

The Technology Barrier

What is GIS


ArcGIS Pro - planning - Layers
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
History
Python
ModelBuilder
Environments
Tools
Ready To Use Tools
Geoprocessing
Feature Analysis
Raster Analysis
Portal
Summarize Nearby
Summarize Within
Summary Statistics
Enrich
Clip
Intersect
Union
Tools
Network Analysis
Geostatistical Wizard
Business Analysis
Raster Functions
Function Editor
Raster
Workbench
Data Interoperability
Contents
Search
Drawing Order
new imagery
RGB
Red: Band_1
Green: Band_2
Blue: Band_3
Map
Layers
Geomatics is defined as the modern discipline which integrates the tasks of gathering, storing, processing, modeling, analyzing, and delivering spatially referenced or location information.
It encompasses the disciplines of surveying, hydrography, mapping, remote sensing (often called earth observation) and geographic information processing, often called geographic information systems (or GIS).
Geoprocessing
Find Tools
Favorites
Toolboxes
Portal
Calculate Field
Buffer
Near
Spatial Join
Intersect
Recent
Clip
Raster To Geodatabase
Contents
Tasks
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Selected Features: 1
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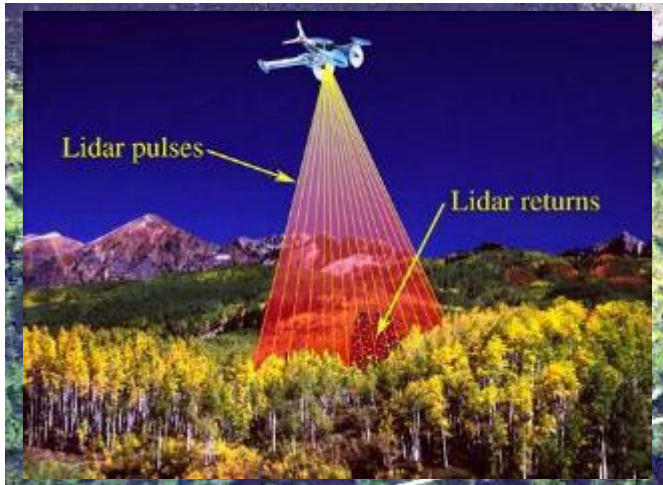
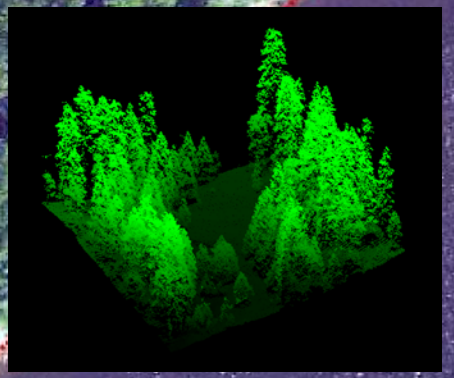
2020-02-07

New high-resolution imagery has been obtained for the reserve lands and currently having Lidar data collected.

Lidar (/ˈlaɪdɑːr/, called LIDAR, LiDAR, and LADAR) is a surveying method that measures distance to a target by illuminating the target with laser light and measuring the reflected light with a sensor. Differences in laser return times and wavelengths can then be used to make digital 3-D representations of the target.





GIS Strategic Plan

- To succeed in GIS implementation you need a strategic plan.
- Institute a ten-step process which is called the “GIS planning methodology.”
- Within its steps the planning methodology covers preparatory tasks, system requirements, intra-organizational issues, costs, and other important concerns.
- Created by Roger Tomlinson, the design is pre-planning effort that must take into account all issues, (internal and external).

10 Step Plan

I will just speak to a 2 of these.

- The steps in Tomlinson's planning methodology are

1. Consider the strategic purpose, (vision, mandate)
2. Plan for the planning (team building)
3. Conduct a technology seminar (something we are doing today)
4. Describe the information products (what we what to make)
5. Define the system scope
6. Create a data design
7. Create logical data models
8. Determine system requirements
9. Perform benefit-cost, migration, and risk issues.
10. Make an implementation plan

Tomlinson, Roger. 2003. *Thinking About GIS: Geographic Information Systems Planning for Managers*

1. Consider the strategic purpose, (vision, mandate)

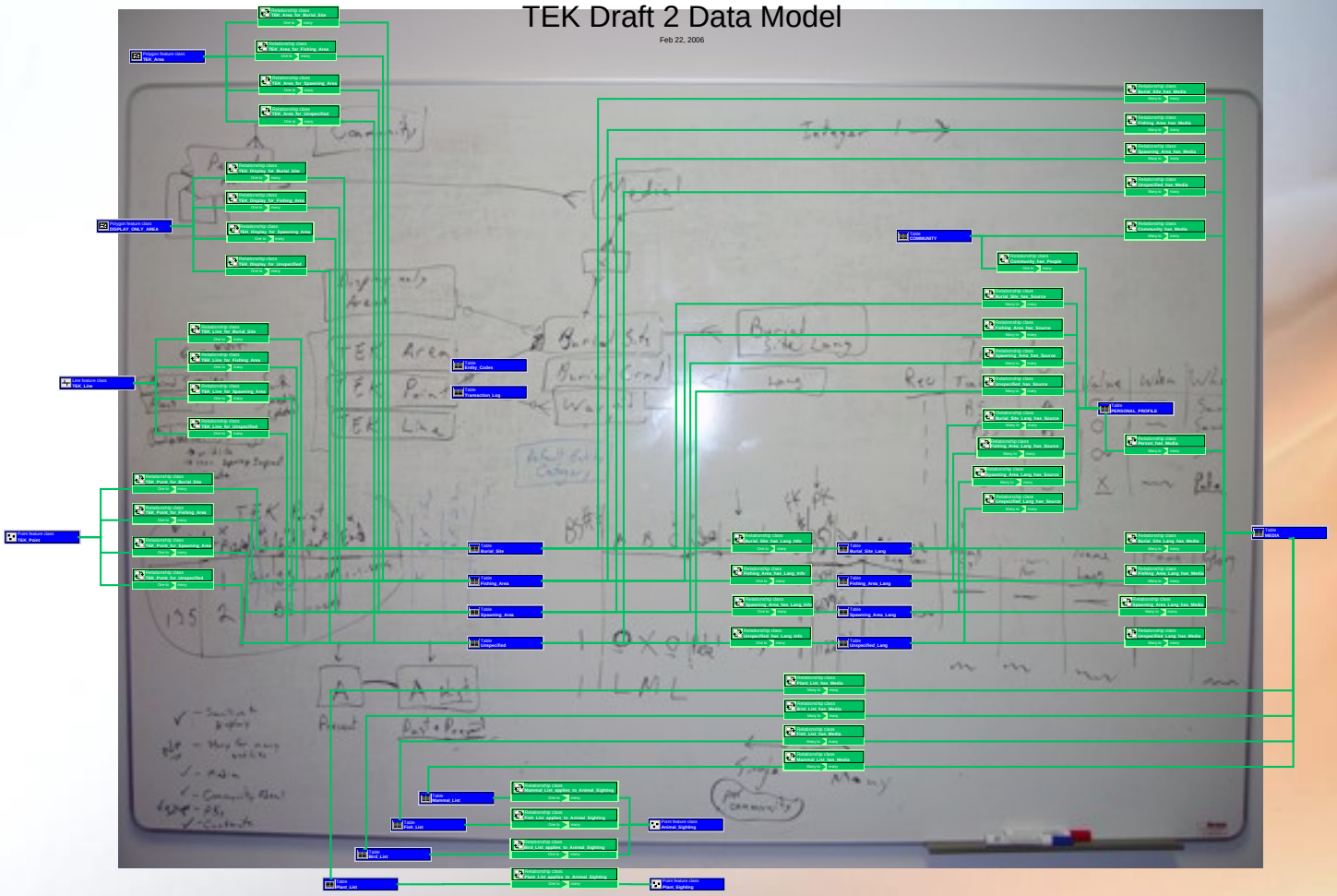
- In the first step of the planning methodology, consideration of the goals, objectives, mandates, and overall purpose of the organization is advised.

- In so doing, the planning and implementation process and its result should match with the organization's mission.

7. Create Data Models

- The choice of a logical data model for the GIS reflects the nature of the geographic features that are dealt with by the organization.
- There are many kinds of data models for handling GIS data.
- One or many models will be used in the system.

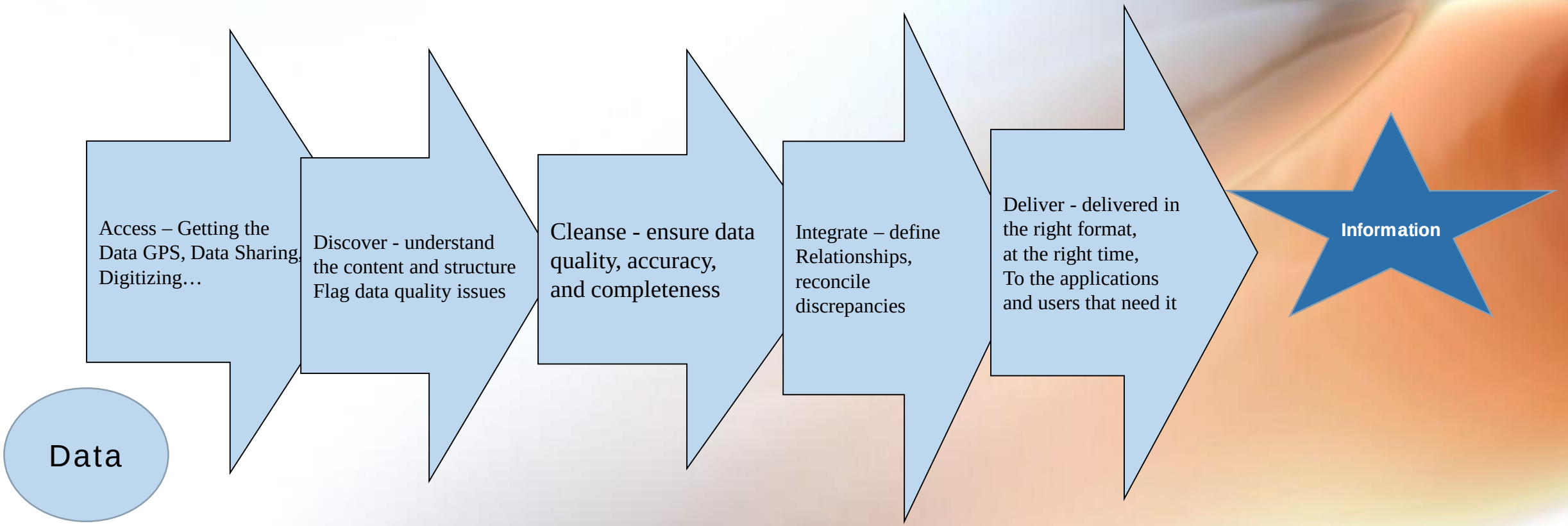
Data Model



… build a data model that meets community need and can evolve.

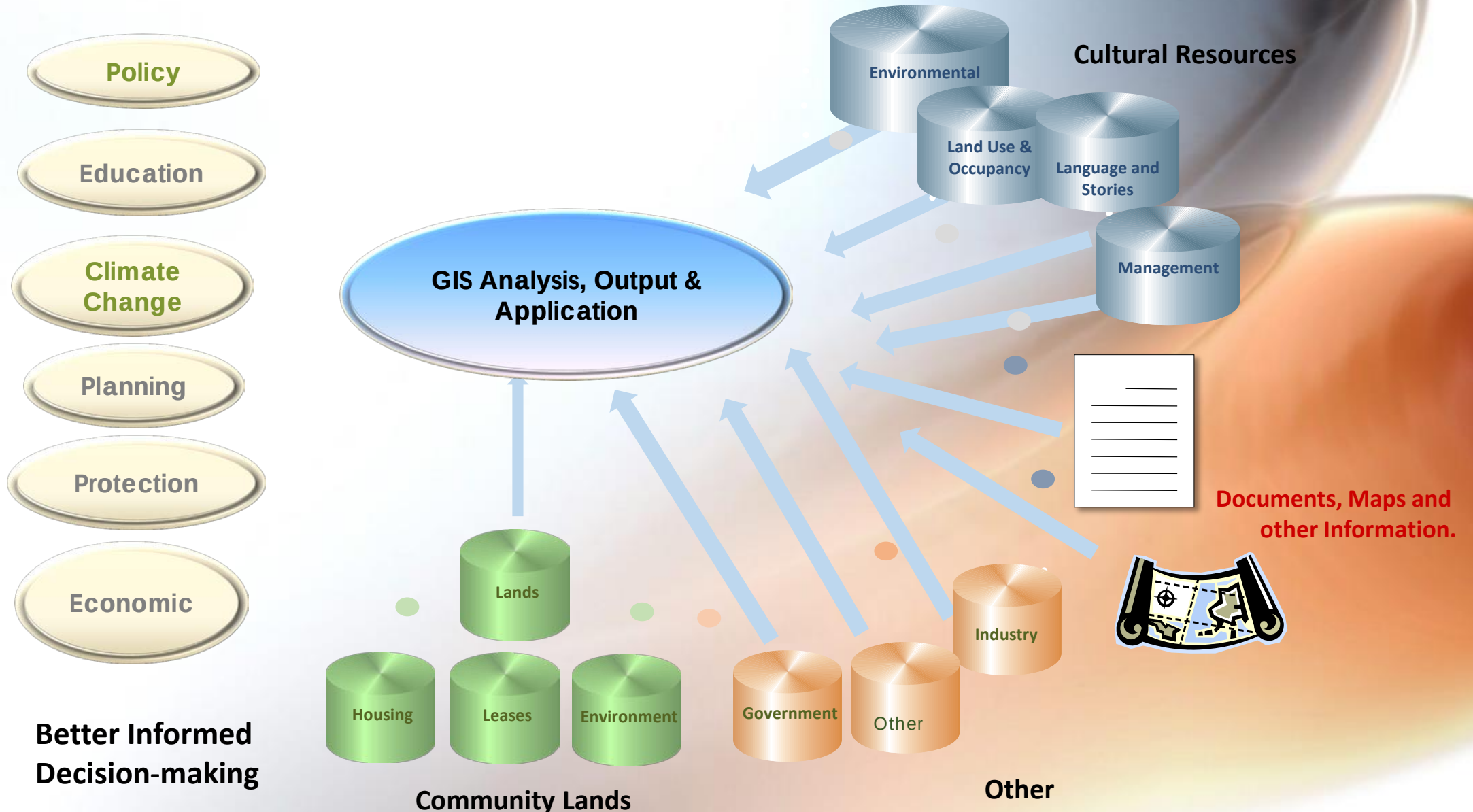
Create, Integrate → Distribute

- By looking at data integration as a process, it is possible to see how data is moved and transformed into information that enables decision-making



Source: Informatica.com

Knowledge Centre



Moving Forward: Geospatial Extension Initiative

Establish a National Indigenous Geospatial Extension Initiative through the *Resource Centre*. Form a Working Group/Task Team /Committee/Provincial Pilots. Remove the barriers.

- ✓ Develop a GIS Strategy to engage with the Federal and Provincial governments to support long term community geospatial funding.
  - software
  - hardware
  - training
  - maintenance

Look at other supporting models such as The National Tribal Geographic Information Support Center (NTGISC), also known as "Tribal GIS.

- ✓ Ensure access to innovative and maintained geospatial advances and unencumbered access to digital data sets(imagery, vector).
- ✓ Deployment of principles to guide the use of technology.
- ✓ Create data standards, policy and access protocols.
- ✓ Support the development of knowledge applications and innovations.

- Work with First Nation members to support long-term GIS Implementation, management, maintenance, and application development.

Closing

- GIS implementation is a costly, time consuming and at times can be a frustrating experience.

- The value of GIS cannot be understated the more effort and information you put in...the greater the returns.

- **Maintaining** a GIS is critical to success! It takes effort, support, resolve and time.

Thank You

David L Mackett, dmackett@lacdesmillelacs.ca