



**Western
Heritage**

Archaeology & Heritage Management

Community Engagement

Environmental Footprint Monitoring

Geomatics

Geotechnical Solutions

Satellite Imagery

Our Capabilities

Proven Experience. Trusted Expertise. Innovative Solutions.

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WHO WE ARE

Since 1990, Western Heritage has demonstrated it has the expertise to deliver innovative solutions for the needs of our customers across Canada and around the world. We are the premier choice for heritage and cultural resource management services and digital landscape mapping, modeling, classification, and monitoring. We serve customers across many sectors, from resource industries such as mining, forestry, and petroleum to the transportation industry, government agencies, municipalities, and private sector developers.

Services

Archaeology and Heritage Management

Community Engagement

Environmental Footprint Monitoring

Geomatics

Geotechnical Solutions

Satellite Imagery

Values

Quality: Delivering what our customers need, when they need it, by continuously improving our processes and services to deliver maximum value.

Reliability: Delivering the solution on schedule and on budget.

Safety: An integral part of our corporate culture, our employees embrace the idea that doing a job well means doing a job safely.

Responsibility: Incorporating cultural and environmental considerations in all of our decisions.

Relationships: Developing and maintaining long term relationships with our customers, regulatory agencies, and the communities in which we operate.

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Archaeology and Heritage Management

For more than 25 years, resource development industries such as mining, forestry, and oil and gas have relied on Western Heritage for their heritage compliance and information needs. With decades of industry experience, our senior management team can provide solutions to ensure regulatory compliance as quickly and cost effectively as possible.

Cultural Resource Management (CRM) is about managing potential conflict between development and the preservation of sites, buildings, and landscapes with historic, archaeological or cultural significance.

Western Heritage helps our clients balance their development activities with appropriate CRM responses. With specialists in both the historical and archaeological fields, we have the scientific depth and professional expertise to address complex heritage management concerns for clients in Canada and around the world.

Western Heritage specializes in providing archaeological and heritage management services to ensure compliance with all relevant regulations.

Services include:

- Historical resource impact assessments and overviews (HRIA's, HRO's)
- Stage 1, 2, 3, and 4 assessments
- Heritage screening
- Surveying
- Site Excavation and Mitigation

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Community Engagement

Around the world, meaningful and effective community engagement has become one of the most important aspects of any company's operations and corporate social responsibility plans.

Western Heritage process for community engagement follows four main pillars:

- 1) Building Relationships and Trust
- 2) Building Community Knowledge
- 3) Building Shared Value
- 4) Building Sustainability.

Western Heritage considers these pillars within the broader context of the Cultural Landscapes a community is situated within. Cultural landscapes incorporate both tangible and intangible values of cultural and natural features, as well as the interactions between people and their surrounding environments.

The Western Heritage approach to community engagement is based on working with communities and providing them with the knowledge to fully understand proposed developments, along with the knowledge for effective conservation and management planning. We believe in the importance of working with communities to create shared value, and we believe strongly in the importance of building sustainability into any community plans. To do this, Western Heritage uses its own experienced staff, expert associates, and community members.

Whether you represent the interests of a resource development company, a community involved in development, an Aboriginal or Indigenous group, or a government agency, Western Heritage can work with you to develop a sustainable action plan to address community needs and concerns.

Some of the components of typical sustainable engagement plans include:

- Community Surveys and Interviews
- Open Houses and Workshops
- Stakeholder Meetings and Discussions
- Capacity Building and Training Programs
- Co-management Planning
- Traditional Knowledge Studies
- Traditional Land Use Studies

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EFMP: ENVIRONMENTAL FOOTPRINT MONITORING PLATFORM

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Layer Control

- ☐ Show/hide all
- ☒ Editing Layer
- ☒ AOI
- ☒ Base Layers
 - ☐ Google Terrain
 - ☐ Google Traffic
 - ☒ Google Satellite

Choose Index

- VHealth
- VProductivity
- Land Cover
- Salinity
- Turbidity
- Depth

Create Report

Dashboard Load Analyze Download

Polygon

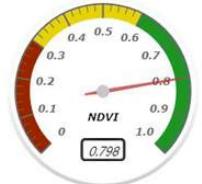


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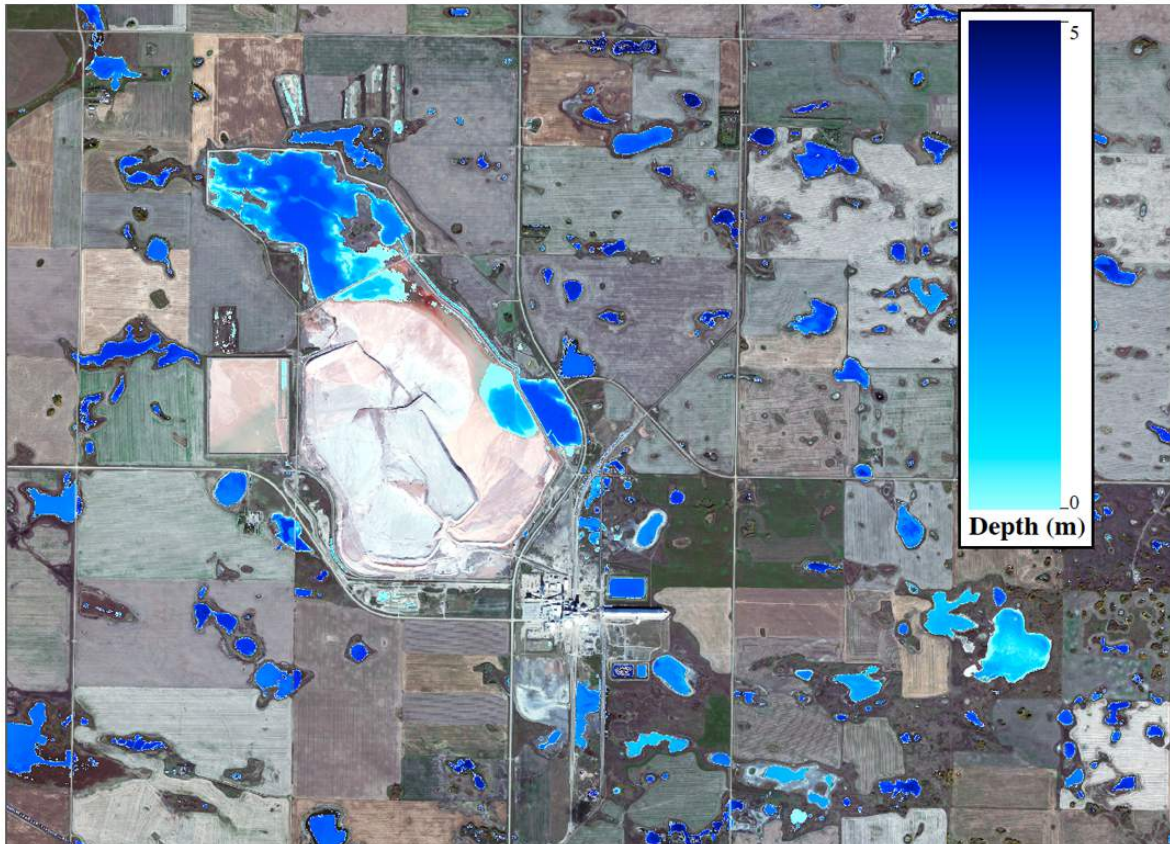


Year: 2011 Month: 06 Date: 23 Dashboard

Dashboard



VHealth





Environmental Footprint Monitoring

The WH Geomatics Environmental Footprint Monitoring Platform (EFMP) provides managers in industry and government with a tool to assist in the monitoring and reporting of environmental health within the development footprint they have defined.

The service utilizes high resolution satellite imagery and specialized remote sensing imagery analysis techniques to generate accurate and quantifiable information on the health and productivity of the environment within the project footprint. Designed to operate from initial planning stages to project closure, the service is essential for monitoring reclamation, cumulative impacts, and tailings. The monitoring frequency can be customised to address longer term, post closure monitoring. The platform can be accessed anywhere and anytime via a private web portal.

Benefits:

- Monitor and track change of landscape disturbance and habitat integrity
- Generate current information on the health of terrestrial and aquatic communities
- Track progress of reclamation and project area environmental goals
- Provides “big picture” analysis of entire project area using satellite images to provide a visual reference and support data
- Helps focus ground testing towards the areas of highest interest
- Ability to “look back” using archival images to compare project area footprint and health pre, during, and post- development
- Web based platform provides constant access to information and ability to generate reports in-house and on demand

The service is ideal for monitoring reclamation areas in the mining and oil and gas sectors, as well as for monitoring other project areas where vegetation health is a critical factor.

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Geomatics

Geomatics comprises the science, engineering involved in extracting and integrating information from spatially referenced information sources. Western Heritage's geomatics department specializes in the detailed mapping of landcover and landscapes, as well as applying and interpreting other data sets across these landscapes.

Detailed maps and reports can be tailored to your project needs to include all relevant information from digital terrain models to mapping infrastructure.

Our capabilities include remote sensing, GIS and custom modeling, and data extraction services. These are project specific and Western Heritage assists its customers when the customer's internal geomatics services are temporarily over subscribed. Western Heritage staff can also assist with geospatial programming, including even mobile applications.

Our geomatics services can be used alone to provide answers and data for specific problems, or utilized as part of our extensive heritage and cultural management services.

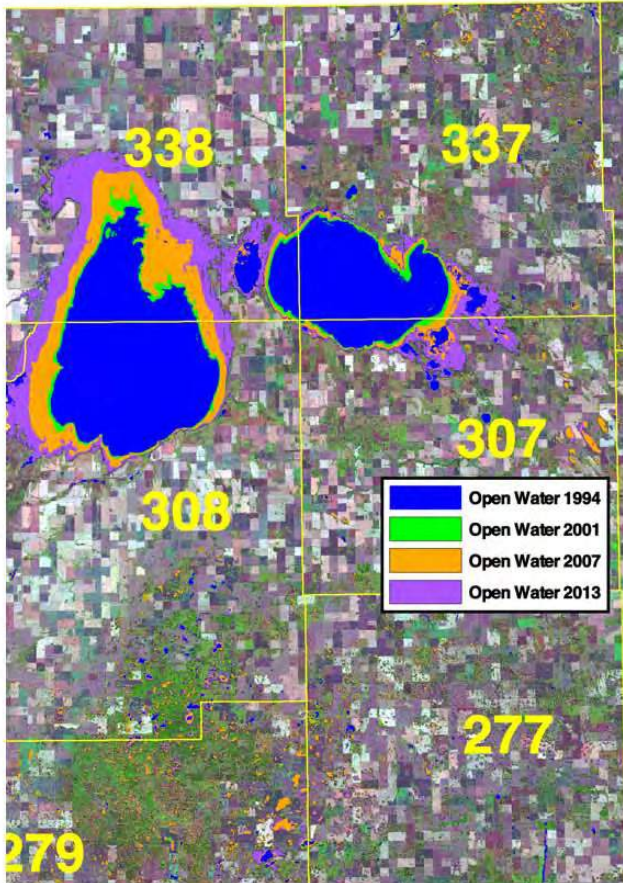
Landcover Analysis

Accurate landcover provides the base for understanding the environment of a study. With this base it is possible to analyze such important environment attributes habitat availability, habitat fragmentation, or community safety attributes such as fire risk through an assessment of natural fuel loadings or flood risks through monitoring surface water and surface moisture. Western Heritage creates accurate landcover models and provides these specific services:

- Land use mapping
- Habitat mapping
- Wildfire fuel loads mapping
- Flood mapping

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Digital Terrain Modelling

Western Heritage creates digital terrain models from a variety of sources ranging from satellites to UAVs. Using satellites, it is possible to create a digital elevation model with sub-meter accuracy, anywhere in the world.

Change Detection

Outside of our comprehensive Environmental Footprint Monitoring Platform, Western Heritage completes change analysis projects to meet specific customer needs, such as

- Change in Impervious cover
- Change in landuse
- Change in landcover
- Change in Elevation (subsidence measurements)

Site Planning

Western Heritage works with its customers to help optimize their site planning in relation to landscape, infrastructure, significant cultural and natural features and other constraints. Western Heritage helps identify the alternatives with the fewest conflicts for assessing development right of ways.

Western Heritage has provided geomatics services to customers around the world, from local, regional and national customers to international governments and agencies.

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Geotechnical Solutions

Western Heritage offers a wide range of geotechnical solutions including near-surface geophysical studies and geo-archaeological services.

Geotechnical approaches produce unique data in order to address specific project un-certainties.

Western Heritage provides these solutions as part of heritage management programs or as stand-alone services to address specific development problems, including cemetery studies, locating unmarked burials, and land use or disturbance histories.

Ground Penetrating Radar

Ground-penetrating radar (GPR) uses reflected radar pulses to see under the earth's surface without digging or drilling. GPR can be used on most surfaces, is non-intrusive and non-destructive, and can detect subsurface changes to a depth of several metres.



Magnetometry

Magnetometry can be used to measure the magnetic properties of a site to locate and identify possible cultural features, such as disposal pits, burn areas (campsite hearths), structural remains, iron artifacts and other features of vital interest to archaeological interpretation.

Western Heritage develops and uses specialized instrumentation to locate and identify cultural features, minimizing costly field time and damage to cultural remains.



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Magnetic Susceptibility

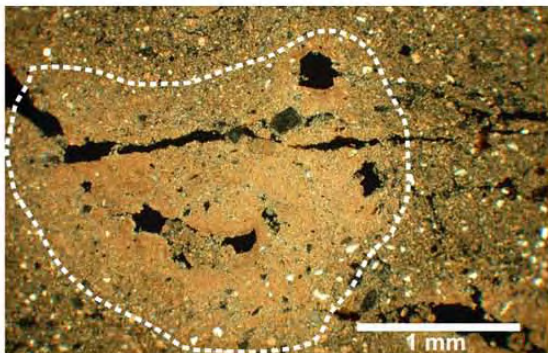
Magnetic susceptibility is a measure of a material's ability to become magnetized by an external magnetic field.

When measured in a systematic way, magnetic susceptibility can be used to detect evidence of human occupation even when no distinctive archaeological features have survived.



Stratigraphic Mapping

Detailed stratigraphic mapping provides more accurate knowledge of the extent and nature of any historic/heritage resources that may be present within the footprint of a proposed development, appreciably reducing uncertainty and improving the accuracy of historic/heritage resource impact assessments.



Soil Micro Morphology

Soil micromorphology (thin section analysis) is the microscopic examination of undisturbed soils, and allows soil components (i.e. mineral and organic particles, post-depositional features) to be observed in relation to each other. This method is particularly useful in addressing questions regarding site disturbances, or landscape use, such as soil fertility management, or history of use of hearths or refuse pits.



OSL Profiling

A portable optically-stimulated luminescence reader (POSL) can be used to estimate relative ages, document cultural and natural sediment deposition at a site, and examine mineralogical changes. This information can contribute significantly to the interpretation of archaeological sites, particularly in areas that are otherwise difficult to interpret. Western Heritage applies POSL analysis routinely in our work in the fields of heritage management, archaeological research, and mitigative excavation.

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Satellite Imagery and Software Sales

Satellite imagery has changed the way we see the world.

Detailed, up to date imagery provides information faster and at a fraction of the cost of traditional imagery sources such as air photos, allowing more informed planning, monitoring, and decision making. Archival imagery allows a look into the past, providing valuable information that may otherwise be unavailable.

Western Heritage provides satellite imagery for every region of the world, with spatial resolutions from 1 km to 30 cm. We are a certified reseller for Digital Globe. Our advantage is our detailed technical knowledge of each satellite and its applications, access to the technical experts of the satellite owners, and the ability to quote and receive payments in local currencies. Our most significant benefit is our quality control. Western Heritage will not sell imagery that does not meet the customer's quality specifications.

We can supply images from optical or radar satellites:

Optical Satellites:

- GeoEye, Ikonos, Worldview I, Worldview II, Worldview III, Quickbird
- RapidEye, Spot, LandSat

Radar Satellites:

- Radarsat, ASAR, Terra-x and more

Western Heritage also distributes specialized imagery software that we use internally to deliver images effectively to our customers.

Western Heritage is a supplier of:

- GeoExpress from LizardTech
- MrSid compression services from Lizardtech

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Our Customers

Western Heritage provides premier services to our customers, across Canada and around the world.

We specialize in managing projects in the resource development sector, including mining, forestry and oil and gas. We also have extensive experience in engineering, construction and infrastructure development sectors.

Mining

Mines have complex development histories. Western Heritage has worked on projects ranging from exploration to mine expansion or reclamation. Each stage requires a different level of expertise and we have helped a diverse range of mining customers attain heritage clearances. Heritage management for these projects are often part of larger EIA studies.



Petroleum

Performance is critical for this industry. With a large staff of archaeologists, we can meet the most demanding schedules. We have provided expertise for oil and gas developments that involve seismic work, facility construction, well site placement, flowlines, access road development and pipeline planning and assessment.



Forestry

Our experts have decades of experience dealing with forestry-related landscape management issues. We can address the most complex historical and cultural concerns in a timely manner - important in an increasingly regulated and margin-sensitive environment.

Western Heritage provides highly-trained and well-equipped crews to help large and small forestry companies manage their historical concerns.



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Infrastructure

Western Heritage has a wide range of experience on infrastructure projects, including water and power lines, dams, and drainage networks. We are well equipped to engage in any stage of archaeological assessment required for these developments, which can include heritage screening, field surveying, and, if required, mitigation



Land Use

Land use developments include military bases, reservoirs and agricultural projects that affect large land areas and do not fit into specific industrial categories. Western Heritage applies our heritage resource management expertise and flexibility when creating solutions to address the size and complexity of land use development assessments.



Transportation

Often, the greatest challenge for highway development is the reduced flexibility for site avoidance due to design and terrain constraints, meaning site mitigation may be required. Western Heritage maintains trained staff, support infrastructure and management expertise to complete site mitigation in a practical, expedient, and cost-effective manner.

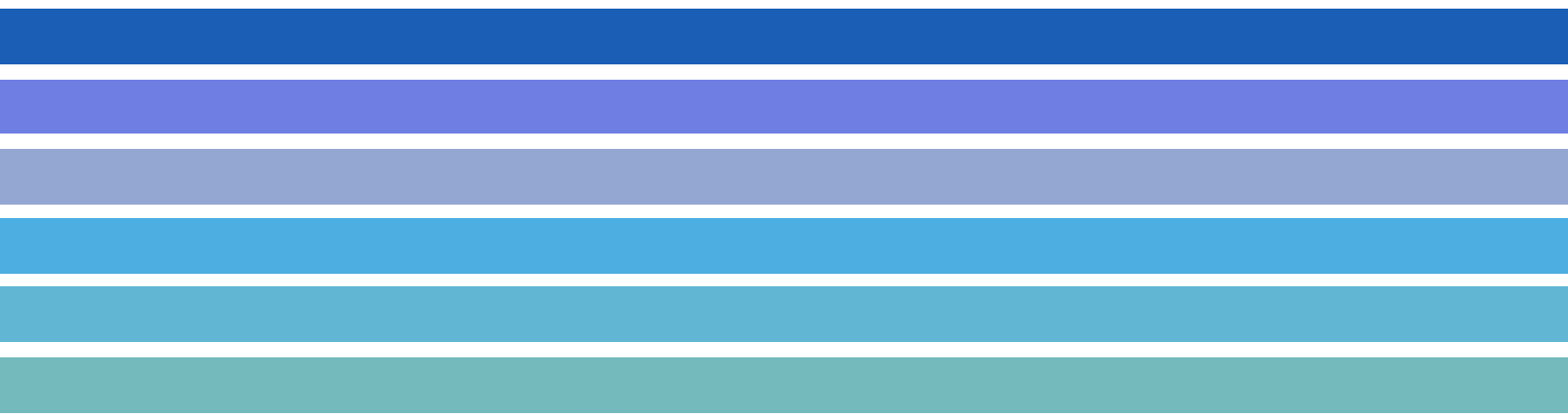


Urban Development

Western Heritage has extensive experience in heritage resource management (CRM) in urban areas throughout Canada. Sensitive historical and cultural sites may require minimum-impact approaches to data collection. As a recognized expert in historical and archive-based research, we can employ non-destructive techniques - including ground-penetrating radar - for geophysical assessment of urban sites. Our approach allows for the collection and analysis of as much information as possible prior to the subsurface inspection phase, which frequently results in increased planning accuracy and overall reduced project costs.

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