

Delivered Files

ABMI Human Footprint Inventory for 2012 conditions (Version 3).

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Human Footprint Map

The ABMI defines Human Footprint (HF) as: the temporary or permanent transformation of native ecosystems to support residential, recreational or industrial land uses. Under this definition, HF includes the geographic extent of areas under human use that either have lost their natural cover for extended periods of time (alienating HF; e.g., cities, roads, agricultural land, and surface mines) or whose natural cover is periodically reset to earlier successional conditions by industrial activities (successional HF; e.g., cut blocks and seismic lines). The Alberta Biodiversity Monitoring Institute (ABMI) tracks the status and trends in HF across the province of Alberta. The ABMI Human Footprint Inventory for 2012 conditions (Version 3) is a GIS polygon layer that describes the spatial distribution of HF across the province of Alberta up to the year 2012, where each polygon indicates a type of HF (Table 1).

IMPORTANT: this version of the ABMI HF Inventory does not account for succession (or reclamation) of human footprint, but treats all types of human footprint on the landscape equally. Put another way, successional HF is treated the same as alienating HF despite the vegetation recovery that almost certainly will have occurred since the development. The current map does not present age of disturbance or the current habitat/vegetation cover within features such as cut blocks or seismic lines; however future versions of the ABMI's GIS maps will include this information (we are currently working on this). Any GIS analysis or subsequent interpretation that does not account for succession or reclamation of alienating/successional HF should be done with caution.

This product is not error free. It draws on data from multiple locations, some of which has not yet been independently verified by the ABMI. An accuracy assessment of this product is currently being completed and will be published in the near future. We continuously work to improve the accuracy and precision of this product.

This GIS polygon layer is continuously being updated, and new versions will be released periodically. A 2007 and 2010 versions are also available for download in the raw data download section of the ABMI's website (www.abmi.ca). The ABMI is currently working on an update to this product to 2014 conditions.

Table 1: ABMI HF type descriptions. HF type values are stored in [PublicCode] field of ESRI file geodatabase.

HF Type	HF Description
Urban & Rural Features	
Urban	Cities and towns
Rural (Residential/Industrial)	Small rural development (mostly residential but some industrial)
Other Disturbed Vegetation	Recreation areas and other vegetated areas created for human use, including golf courses, grave yards, vegetated edges of airports, and any other disturbed areas that have recovered vegetation
Industrial & Resource Extraction Features	
Industrial Site Rural	Rural area developed for industrial use
High Density Livestock Operation	Confined feeding operation and other high density livestock area

HF Type	HF Description
Peat Mine	Area where vegetation is disturbed
Well Site	Well pads created by the energy industry
Mine Site	Area where vegetation is disturbed
Wind Generation Facility	Area around the windmill
Hard Linear Features	
Road – Hard Surface	Paved or gravel
Rail – Hard Surface	Usually gravel
Soft Linear Features	
Pipeline	Area where vegetation is disturbed
Transmission Line	Area where vegetation is disturbed
Seismic Line	Area where vegetation is disturbed
Vegetated Roads, Verges and Ditches	
Road/Trail (Vegetated)	Road/Trail without gravel or pavement
Road – Vegetated Verge	Vegetated strips along paved/gravel roads
Rail – Vegetated Verge	Vegetated strips along railways
Human-created Water Bodies	
Borrow-Pits, Dug-outs, Sumps	Created to extract fill, or for livestock watering
Municipal (Water and Sewage)	Created for municipal purposes
Reservoirs	Man-made lake
Canals	Created to transport water
Cultivation	
Cultivation (Crop/Pasture/Bare Ground)	Any area where evidence of cultivation is visible during the photo interpretation
Managed Forest	
Cut Blocks	Area with trees harvested for industrial purposes

GIS Data

The ABMI Human Footprint Inventory (2012 conditions; Version 3) is the product of multiple sub-layers (Table 2) many of which were obtained through a data-sharing agreement with Alberta Sustainable Resource Development and the forest industry. The sub-layers were processed using the ArcGIS command “UPDATE” to create a single layer. The layers were organized according to their order of precedence (1-21) such that a sub-layer with high precedence (e.g. sub-layer 1) would mask all layers of lower precedence (e.g. sub-layers 2-21). Table 2 provides a brief description of the layer contents, the source of the data, geometric shape type (i.e., polygon, linear, point), any modifications made by ABMI, the order of precedence and the associated HF type the data is represented by. Note that a given sub-layer may contribute to multiple HF types. Linear features were converted into polygons according to the widths described in Table 3. Linear feature conversion widths were determined with the aid of the 2012 SPOT 5 (2.5m resolution) image.

Table 2: ABMI Human Footprint Map source GIS layers, order of precedence, and modifications

Order	Layer	Layer Contents	Source Data	Shape Type	Modifications	HF Type
1	Reservoirs	Water reservoirs.	SRD Base Layer Database (Hydropoly).	Polygon	Data were verified against 2012 SPOT image	Reservoirs
2	Borrow Pits, Sumps, Dugouts, Lagoons	Borrow Pits, Sumps, Dugouts, Lagoons	SRD Base Layer Database (Hydropoly).	Polygon	Data were not verified against 2012 SPOT image. All features were included regardless of date.	Borrow-Pits, Dug-outs, Sumps, Municipal (Water and Sewage)

Order	Layer	Layer Contents	Source Data	Shape Type	Modifications	HF Type
3	Roads	All paved and gravel roads, does not include vegetated margins.	SRD Base Layer Database (Roads).	Linear	Data were not verified against 2012 SPOT image.	Road – Hard Surface
4	Rail Lines Hard Surface	Railway tracks and associated gravel pad; does not include vegetated margins.	SRD Base Layer Database (Rail Line).	Linear	Data were not verified against 2012 SPOT image.	Rail – Hard Surface
5	Canals	Canals, human-created water passageway.	SRD Base Layer Database (Hydropoly, Streamline).	Polygon, Linear	Data were not verified against 2012 SPOT image.	Canals
6	Vegetated Surfaces of Roads, Trails, and Railways	Green margin (verge) of roads, trails, and railways. Does not include the hard surface (e.g., paved portion of roads, or rail/gravel portion of railways).	SRD Base Layer Database (Roads).	Linear	Data were not verified against 2012 SPOT image.	Road/Trail (Vegetated), Road and Rail – Vegetated Verge
7	Mine Sites	Areas of ground that were consistently open and/or expanding over multiple years, usually close to lakes or rivers, were considered to be mines/gravel pits. Excluding features described in A, end- pit lakes and areas of ground with heavily disturbed soil with no vegetation re-growing in the Athabasca Oil Sands (including the surrounding areas of mine pits where no vegetation is growing).	SRD Base Layer Database (Access Polygon Layer), additions by ABMI using 2012 SPOT image.	Polygon	No mines were deleted from the SRD base layer. Mine sites identified in the 2012 SPOT image that were missing from the SRD layer were added by ABMI.	Mine Site, Peat Mine
8	Industrial Sites	Industrial sites.	SRD Base Layer Database (Access Polygon Layer) additions by ABMI using 2012 SPOT image.	Polygon	Added industrial clearing features	Industrial Site Rural
9	Well Sites (Energy) ACTIVE	Well sites.	SRD Base Layer Database (Well Sites), additions by ABMI using 2012 SPOT image.	Point	Well sites within the SRD base layer were not verified against the 2012 SPOT image. No well sites were deleted from the SRD base layer. Well site features identified in the 2012 SPOT image that were missing from the SRD layer were added by ABMI.	Well Site
10	Landfill	Landfill sites which include landfills, dumps, waste disposal, and waste transfer sites.	Created by ABMI using 2012 SPOT image.	Polygon	None. Created by ABMI.	Industrial Site Rural
11	Recreation & Other Vegetated Facility	Unpaved aircraft runways, grave yards, golf courses, campgrounds, baseball diamonds, parks, shelterbelts, ski hills, DND exercise areas, low	Created by ABMI using 2012 SPOT image.	Polygon	None. Created by ABMI.	Other Disturbed Vegetation

Order	Layer	Layer Contents	Source Data	Shape Type	Modifications	HF Type
		vegetation surrounding airport runways, and clearings from old industrial activity that is now vegetated. This layer was also used to identify green-space that did not fit into other categories such as storage areas and parking lots.				
12	Wind Generation Facility	Wind turbines.	Created by ABMI using 2012 SPOT image. The SRD Base Layer database was used as a reference in interpretation.	Point	Turbines were typically located in southern Alberta and were identified by their long shadows with three blades.	Wind Generation Facility
13	Transmission Lines	Electrical transmission lines.	SRD Base Layer Database (Powerlines).	Linear	Data were not verified against 2012 SPOT image.	Transmission Line
14	CFO, and Other High Density Livestock	Confined feeding operations (CFO), interpreted as the presence of large buildings and fenced pens appearing to be used for the purpose of feeding and confining pigs, chickens, or cows.	Created by ABMI using 2012 SPOT image.	Polygon	None. Created by ABMI.	High Density Livestock Operation
15	Urban and Rural Residential	Urban Residences: A polygon was drawn around areas having >100 buildings per quarter section, including both residential and industrial development. Areas within the urban/residential polygons >5ha with natural vegetation were excluded. Acreages: Includes developments having a density of 10 - 100 buildings per quarter section, including both residential and industrial development. Areas within quarter sections not associated with the development (i.e., natural spaces) were not included. May include industrial sites if these could not be distinguished from acreage developments. Rural Residences: Includes all rural dwellings and buildings that are of a density less than ten buildings per quarter section. The area mapped was the "yard" and did not include crops. May include industrial sites if	Created by ABMI using 2012 SPOT image. Urban residential features from SRD base layer database (city and town), ALCC, and a layer from ALCES group were referenced.	Polygon	None. Created by ABMI.	Urban, Rural (Residential/Industrial)

Order	Layer	Layer Contents	Source Data	Shape Type	Modifications	HF Type
		these could not be distinguished from rural development.				
16	Well Sites (Energy) ABANDONED	Well sites.	SRD Base Layer Database (Well Sites), additions by ABMI using 2012 SPOT image.	Point	Well sites within the SRD base layer were not verified against the 2012 SPOT image. No well sites were deleted from the SRD base layer. Well site features identified in the 2012 SPOT image that were missing from the SRD layer were added by ABMI.	Well Site
17	Cultivation	Agricultural areas used for cultivation. Non-cultivated agriculture including clearings for grazing and future cultivation.	Created by ABMI using the 2012 SPOT image. GVI and AVI were used for reference when available.	Polygon	None. Created by ABMI.	Crop/Pasture/Bare Ground
18	Cut Blocks	Areas where forestry operations have occurred (clearcuts, selective harvest, salvage logging, etc.).	SRD and individual companies, additions by ABMI using 2012 SPOT image.	Polygon	AVI data was updated by individual company data where available.	Cut Blocks
19	Pipelines	Oil & Gas Pipelines.	SRD Base Layer Database (Pipelines).	Linear	Data were not verified against 2012 SPOT image.	Pipeline
20	Seismic Lines	Seismic Lines.	SRD Base Layer Database (cutline).	Linear	Data were not verified against 2012 SPOT image.	Seismic Line
21	Disturbed Vegetation	Disturbed vegetation that does not fit any other category of human footprint.	Created by ABMI using 2012 SPOT image.	Polygon	None. Created by ABMI.	Other Disturbed Vegetation

Table 3: ABMI Human Footprint Map conversion widths: The ABMI Human Footprint Map (2012 Version 3) is a compiled data product of multiple layers; in some cases multiple conversion widths were used to turn linear or point features types into polygons (listed below) that are now represented by a single HF type, whose original feature type is not included in the map. Future versions of the ABMI Human Footprint Map will include these Feature Type descriptions allowing specific conversion widths sizes to be distinguished.

HF Type	Conversion Width (m) (to each side for linear features)
Urban & Rural Features	
Rural (Residential/Industrial)	Sites <1ha: 1ha circle Sites 1-5ha: 5ha circle
Industrial & Resource Extraction Features	
Industrial Site Rural	Sites <1ha: 1ha circle Sites 1-5ha: 5ha circle
Well Site	1ha square
Wind Generation Facility	30x30m square
Hard Linear Features	
Road – Hard Surface	ROAD-PAVED-UNDIV-4L: Paved Surface: 15 INTERCHANGE-RAMP: Paved Surface: 9 ROAD-PAVED-DIV: Paved: 10 on each line ROAD-PAVED-UNDIV2L: Paved Surface: 9 ROAD-PAVED-UNDIV-1L: Paved Surface: 6 ROAD-GRAVEL-2L: Gravel Surface: 7 ROAD-GRAVEL-1L: Gravel Surface: 5

HF Type	Conversion Width (m) (to each side for linear features)
Rail – Hard Surface	Track: 5
Soft Linear Features	
Pipeline	12
Transmission Line	19
Seismic Line	Pre 2005: 3 Post 2005: 2
Vegetated Roads, Verges and Ditches	
Road/Trail (Vegetated)	Unimproved roads: 6 Ford - winter crossing: 0, on water; 10, on land Winter road: 9
Road – Vegetated Verge	ROAD-PAVED-UNDIV-4L: Paved Surface + Green Verge: 15 INTERCHANGE-RAMP: Paved Surface + Green Verge: 26 ROAD-PAVED-DIV: Median & Ditch: 34 buffer on each line minus the pave ROAD-PAVED-UNDIV2L: Paved Surface + Green Verge: 22 ROAD-PAVED-UNDIV-1L: Paved Surface + Green Verge: 13.5 ROAD-GRAVEL-2L: Gravel Surface + Green Verge: 22 ROAD-GRAVEL-1L: Gravel Surface + Green Verge: 14
Rail – Vegetated Verge	Track + green: 12
Human-created Water Bodies	
Canals	Minor canals: 1 Major canals: 2