Seismic snapshot

UPCOMING CHANGES TO THE ALBERTA HUMAN FOOTPRINT INVENTORY

The Human Footprint Inventory (HFI) is a public dataset that maps visible disturbances from human activity across the entire province of Alberta. The dataset is updated annually using a combination of aerial imagery, reference datasets, and consultation with subject matter experts.

Seismic lines are linear features developed as part of energy and mineral exploration. Human footprint data on seismic lines is a foundational piece of land-use planning, species at risk recovery planning, and more. Over the past ten years, the HFI team has made tremendous gains in both land-use literacy (i.e., understanding the history of seismic exploration) and access to reference datasets. In the 2023 HFI, users will have access to the most accurate classification and dating of seismic lines ever available to the public.

99%

of seismic lines with year of origin

Year of origin comes from a combination of industry and regulatory reference data as well as interpretation by the HFI team using satellite imagery.

100%

of seismic lines with constructed widths from a regulatory source or estimated by subject matter experts

When we know the year a seismic line was constructed, we can assess whether natural regeneration is occurring as expected or if active restoration treatments are needed. At the same time, the year of origin information improves modelling of seismic line recovery trajectories.

The 2023 HFI is informed by the **Cutline and Trail Attribution Project** (CTAP)—an in-depth project on seismic line construction methods and data sources by Alberta Environment and Protected Areas with the Canadian Association of Geophysical Contractors, Alberta Energy Regulator, and other subject matter experts from 2020 to 2025.

As part of this project, regulatory datasets, information from the Seismic Data Listing Service, and older hardcopy geophysical plans were shared with or purchased by the Government of Alberta to identify, date, and classify seismic lines as well as determine their constructed width. The CTAP classification standards have been implemented in the 2023 HFI seismic feature dataset.

IMPLEMENTED CHANGES IN SEISMIC LINE CLASSIFICATION

The 2023 layer "Seismic lines, trails, and other linear features" will include **eight feature types** that provide a detailed breakdown by seismic construction method and include township survey features and unconfirmed seismic lines.

HUMAN FOOTPRINT INVENTORY (2023)	PREVIOUS VERSIONS
Seismic - Legacy: New terminology consistent with industry and government naming conventions. A discontinued construction method that used bulldozers to create straight lines (typically) in forested regions of the province. Separate from conventional modern lines.	Conventional seismic
Seismic - Low impact: Unchanged. Meandering mechanical- or hand-cut lines with minimal soil disturbance. Prior to 2000, these lines were constructed with small bulldozers and slightly wider than lines later cut with mulchers. **Seismic - Avoidance:** New terminology in the HFI to differentiate meandering lines specifically constructed to preserve large timber. **Seismic - Conventional modern:** New terminology in the HFI to differentiate lines constructed after the year 2000 with conventional methods from older lines with discontinued conventional methods.	Low impact seismic
Alberta Township Survey (ATS) related: A linear feature found along a surveyed quarter section or section boundary from the ATS. These linear disturbances can be the result of any combination of activities such as cleared property boundaries, road allowances, older survey lines, fence lines or seismic exploration. The HFI only captures cleared ATS lines.	New terminology in the HFI
Other linear features: Unchanged. Linear features that are neither managed as recreational trails under the Crown Land Trails dataset nor verified by other reference datasets.	Unchanged from 2022
Recreational trails: Unchanged. From the provincial Crown Land Trails dataset.	Unchanged
Seismic - Unconfirmed: A temporary classification used for seismic lines dated 2002 onwards until the line is verified by regulatory data.	New terminology in the HFI

FOR FULL DETAILS ON CHANGES AND FEATURE TYPES, CONSULT THE HUMAN FOOTPRINT INVENTORY METADATA

HOW WILL THIS IMPACT LINEAR FEATURE CALCULATIONS AND SUMMARIES?

The reclassification of lines may impact summaries at broader scales. Users will see a decrease of ~11% in the total length of legacy seismic lines in HFI 2023 compared to HFI 2022 across the whole province. This decrease can be primarily attributed to the addition of ATS information and new terminology such as avoidance lines. Small decreases in the total length of low impact seismic and other linear features will also be observed.

Summaries may also differ from the forthcoming Government of Alberta *Fact Sheet - Seismic Line Footprint in Alberta* tallies based on government access to regulatory data and the removal of seismic activity if it overlaps new land-use activities such as forest harvest. The HFI does not remove features unless they need to be reattributed based on superior knowledge. However, features are merged in a pre-established order of precedence for each year's single Human Footprint Integrated Dataset.

HOW CAN YOU USE THE HFI SEISMIC LINE DATASET?

The 2023 HFI seismic features contain a wealth of information: feature type, year of origin, constructed width, as well as the reference datasets consulted. Each feature retains its HFI type from previous versions (labeled as "ARCHIVED_FEATURE_TY") so that data users can compare to previous classifications. The HFI dataset is suitable for landscape-level analysis—it is not an operational dataset (e.g., for placing field plots or determining regulatory compliance).

WHAT ARE SOME OF THE LIMITATIONS OF THE DATASET?

Some features remain unattributed due to limitations in information available. The HFI uses multiple reference sources to ensure the highest possible accuracy, but all sources will also have errors.

There are unmapped features due to satellite data resolution (1.5 m), particularly in the form of missing low impact seismic lines. For this reason, low impact seismic will be excluded from regional linear density calculations done by the ABMI. There are an estimated >200,000 km of unmapped linear features. Regardless, the HFI remains the best available estimate of linear features in the province.

We are working towards planning how information derived from lidar data can be used to represent low impact seismic lines and vegetation regeneration in the HFI.