

- VERY HIGH MOISTURE CONTENT (INLAND AFFINITY):** Dark tonal areas associated with low topographic relief and/or low moisture content areas. Commonly associated with low topographic relief and/or low moisture content areas. Commonly associated with low topographic relief and/or low moisture content areas.
- VERY HIGH MOISTURE CONTENT (COASTAL AFFINITY):** Dark tonal areas associated with low topographic relief and/or low moisture content areas. Commonly associated with low topographic relief and/or low moisture content areas.
- LOW MOISTURE CONTENT (NO VEGETATION):** Light tonal areas with unique topographic relief and/or low moisture content areas. Commonly associated with low topographic relief and/or low moisture content areas.
- LOW MOISTURE CONTENT (WITH VEGETATION):** Light tonal areas with unique topographic relief and/or low moisture content areas. Commonly associated with low topographic relief and/or low moisture content areas.
- HIGH MOISTURE CONTENT:** Intermediate tonal areas encompassing the majority of the map. Commonly associated with low topographic relief and/or low moisture content areas.

DESCRIPTIVE NOTES

1) Data sources, software, and pre-classification processing for spectral mapping: LANDSAT Enhanced Thematic Mapper scenes (30 m pixel resolution) covering part of all NTS Map sheets 67-C, B, F, 77-E, F, G, H. These data were used in the image classification.

SPOT 5 panchromatic datasets (10 m resolution). These data were used to develop training areas and, following image classification, to verify classified pixels.

A digital terrain model from the Canadian Digital Elevation Dataset (CDED) was used for display purposes following image classification, and to define the 100 m marine limit boundary.

LANDSAT images were tiled into a single mosaic. However, some spectral imbalances could not be fully corrected and remained in the classified image (northwest region). SPOT 5 data were used on a per-image basis to verify specific locations. Datasets were re-projected to a common projection and datum, Lambert conformal conic projection using NAD 83.

Data processing and analysis were performed with a commercially available image analysis and Geographic Information System (GIS) software. Satellite images were tiled and mosaiced using the PC Geomatica software suite. ArcGIS software was used to display training areas and apply signature files (see below). Analysis and image classification (see 3 below) were performed with ENVI software suite.

2) Production of training datasets and signature files: Selection of training data is a crucial step for Remote Predictive Mapping (RPM) classifications since it is central to the classification process. The quality and accuracy of the final classification is directly related to the quality of the training data used. Identification of training areas relies on many of the same principles as aerial photograph interpretation, namely that distinct areas can be identified and differentiated based on visual characteristics such as tone, texture, size, shape, pattern, and association with other image features. On multi-spectral datasets, spectral tone is the most easily manipulated variable, and provides the ability to examine feature tones in various spectral bands, thus allowing for precise differentiation of features and material types. Moisture content has the greatest influence on surface tonal characteristics (soil reflections). However, a range of factors affect tonal characteristics associated with moisture content: sediment texture (grain size), relative topographic position, slope, aspect, vegetation, mass thickness, and lithology. Seasonal variations occur within the classified images. These are most prevalent in the northwest of the mapped area where outcropping ultra-mafic rocks result in spectrally dark sediments. These bedrock outcrops are readily distinguished from the dominantly spectrally light carbonate bedrock occurring throughout most of the mapped area. However, sediment resulting from these ultra-mafic outcrops leads to some spectral confusion during classifications based on moisture content (discussed in this spectral contour map in the next section).

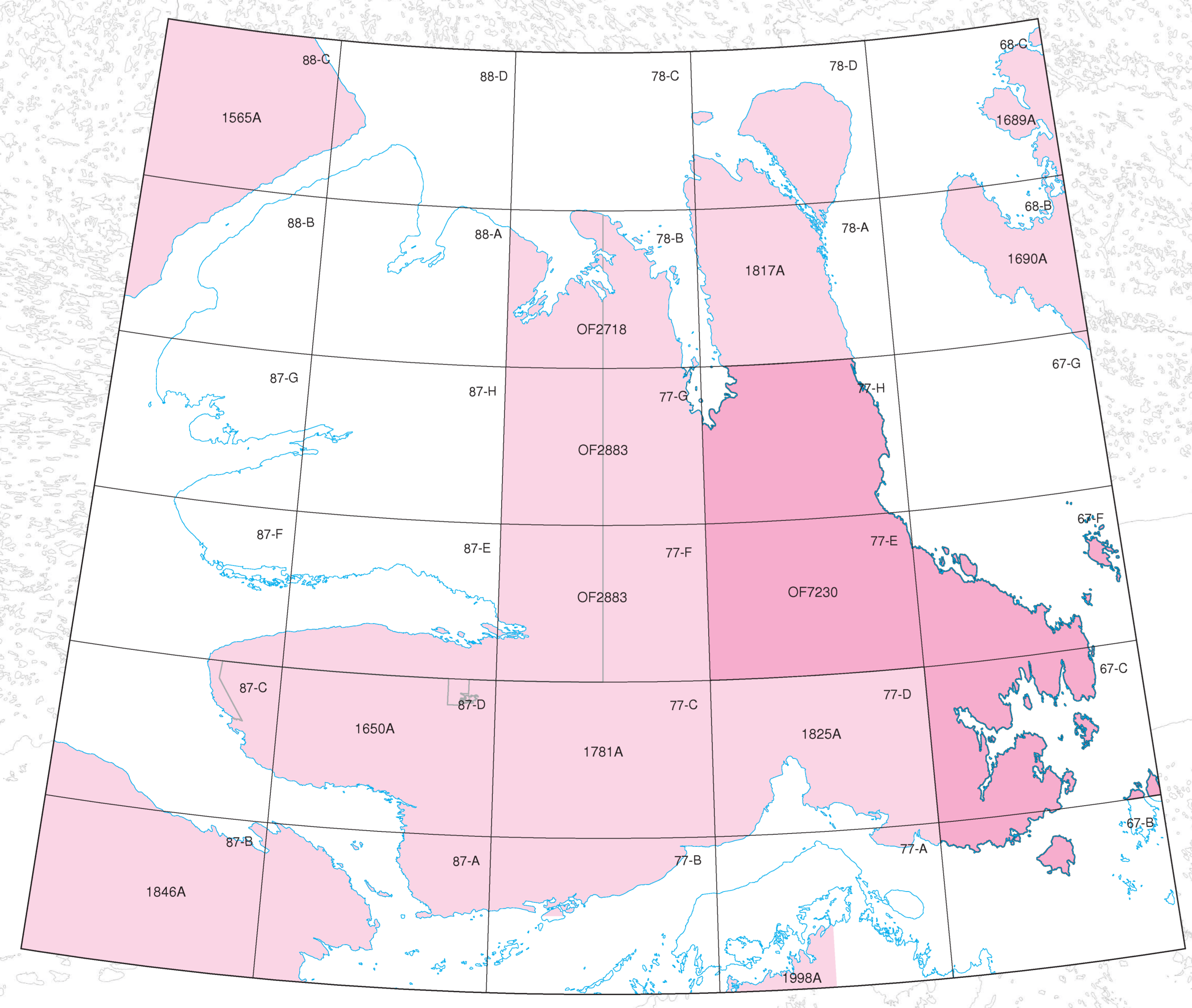
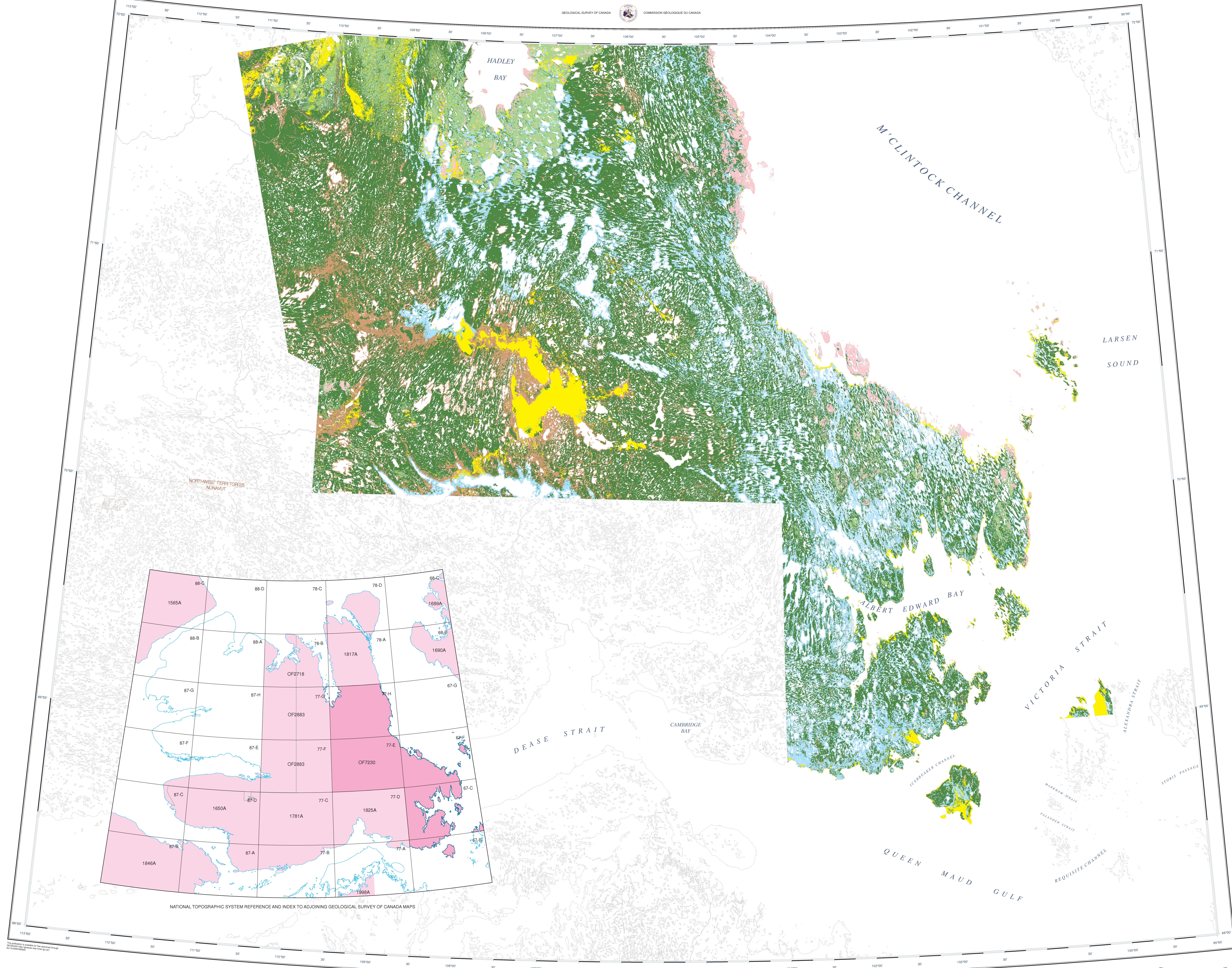
Training areas were mapped as polygons and grouped into four distinct classes representing moisture content: i) bedrock (no moisture and distinctive spectral signature), ii) very high moisture content, iii) high moisture content, and iv) low moisture content. Limited classes were developed in order to provide the most basic and descriptive characterization of tonal characteristics (surface materials) associated with distinct landscape positions. In each class, 30-40 training polygons, distributed throughout the study area, were digitized. As much as possible, differences in the total number of pixels contained within each training area class were kept low to avoid over- or under-representing certain classes in statistical calculations. Due to spectral imbalances within the LANDSAT mosaic, and because of lithological variations within some scenes, three distinctive sets of training areas were employed in three areas of the mosaic. The spatial consistency of resulting classifications was assessed visually between these three areas. Defining training areas relied on expert knowledge on glacial sediment/landform associations, landscape genesis and on integration of field data from this area.

Signature files associate a spectral signature with a given training area. A set of training areas therefore has a complete spectral signature reflecting the variability of tonal characteristics encountered within the polygons of the given class. Defined signature files enables the computer algorithm to associate the remaining unclassified pixels with a known class as specified by the training area signature.

3) Image classification and results: A supervised classification method (Maximum Likelihood classification algorithm) was used for image classification. This classification scheme assigns a value to every pixel based on the probability that the spectral signature of a given pixel belongs to a pre-defined class (from trained signature files).

Results of the image classification highlight pixels of similar spectral characteristics that can be associated with the pre-defined moisture content or bedrock classification of the signature files. Two spectral and members emerge from this classification: i) areas of bedrock, and ii) areas of very high moisture content, typically occurring in topographic depressions (clay common), and frequently associated with accumulations of sediment, vegetation and organic material. Remaining classes represent spectral and tonal characteristics that are transitional to these two end-members.

Further distinctions between moisture content classes are informed by variables such as topographic position of pixels or pixel clusters, relationship to certain landforms, and inferred thickness of surface materials. The rest of this map is a rapid RPM completion to identify areas to guide field data collection and sampling in an area with limited published geological knowledge. The final product reflects and captures the variability of surface materials which can be linked to specific material types (e.g. B, sand and gravel, etc.). To produce a surface geology map, using post-processing rules based on expert knowledge.



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 Geology by: J.E. Lesemann, D.R. Sharpe, and D. Giroux, 2012
 Cartography by: S. Klatten and S. Eagles
 Initiative of the Geological Survey of Canada as part of the Natural Resources Canada's Geomapping for Energy and Minerals (GEM) program
 Base map at the scale of 1:250,000 from Natural Resources Canada, with modifications.

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 A REMOTE PREDICTIVE SURFICIAL MATERIALS MAP
 EASTERN VICTORIA ISLAND
 NORTHWEST TERRITORIES AND NUNAVUT
 Scale 1:500,000 / Échelle 1:500 000

Proximity to the North Magnetic Pole causes the magnetic compass to be erratic in this area. Mean magnetic declination 010.3, 8° 41E, decreasing 30' annually. Readings vary from 1° 44' W in the SE corner to 17° 55' E in the NW corner of the map.
 Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada.
 This map is not to be used for navigation purposes.

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