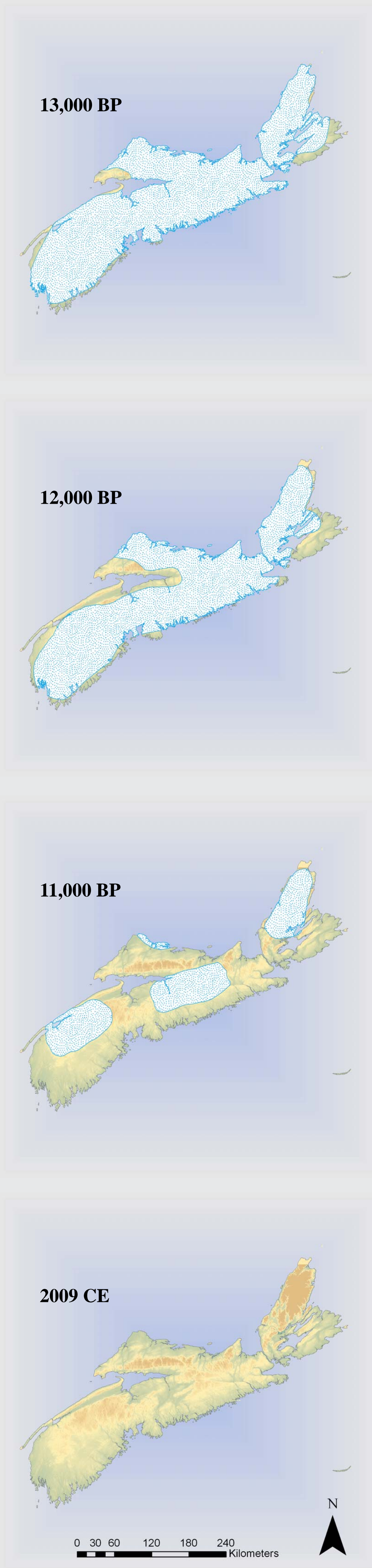


Glacial Drift Prospecting in Nova Scotia

An Investigation of Barite and Gold in Till

Recession of the Wisconsinan Ice Sheet from Nova Scotia 13,000 years before present to the present day



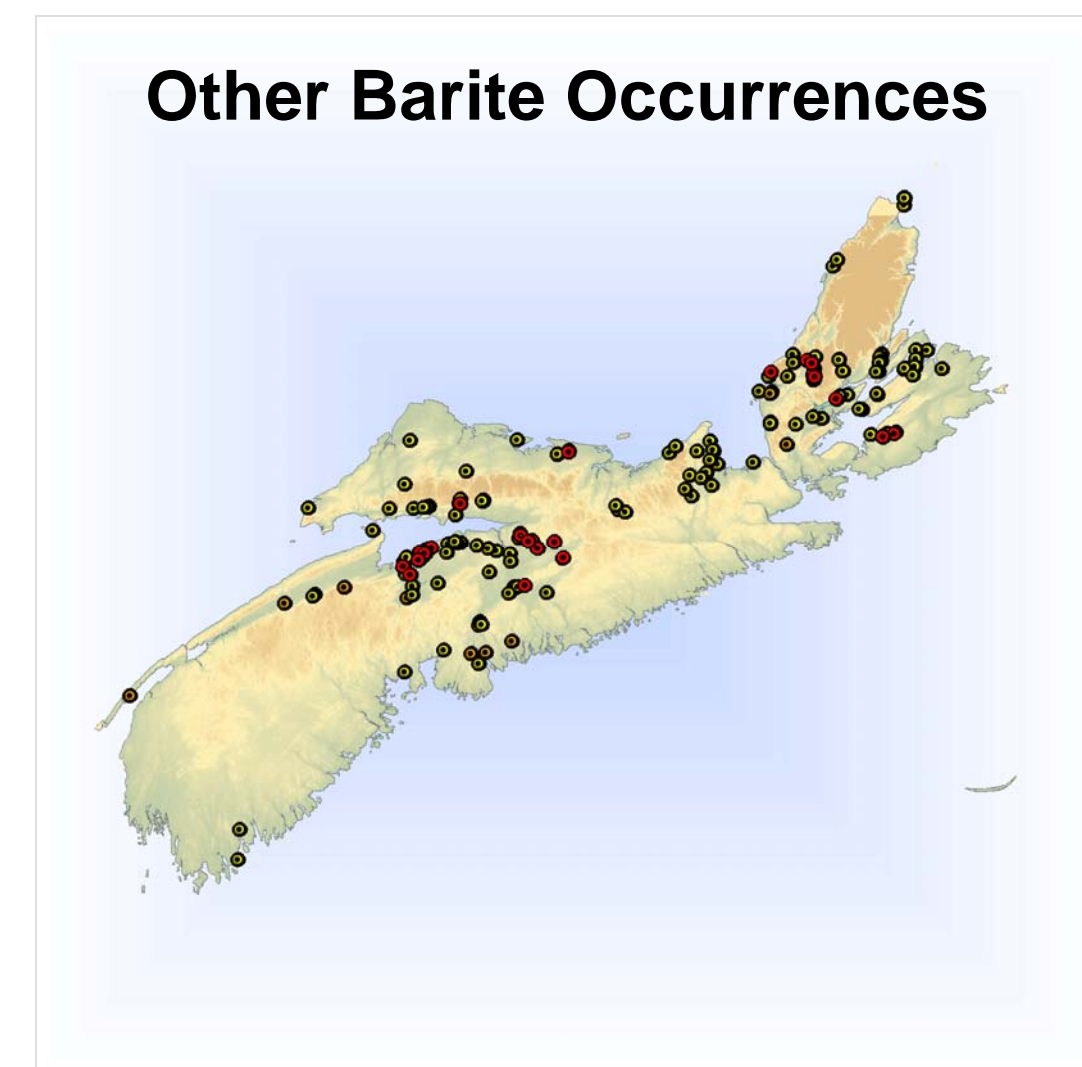
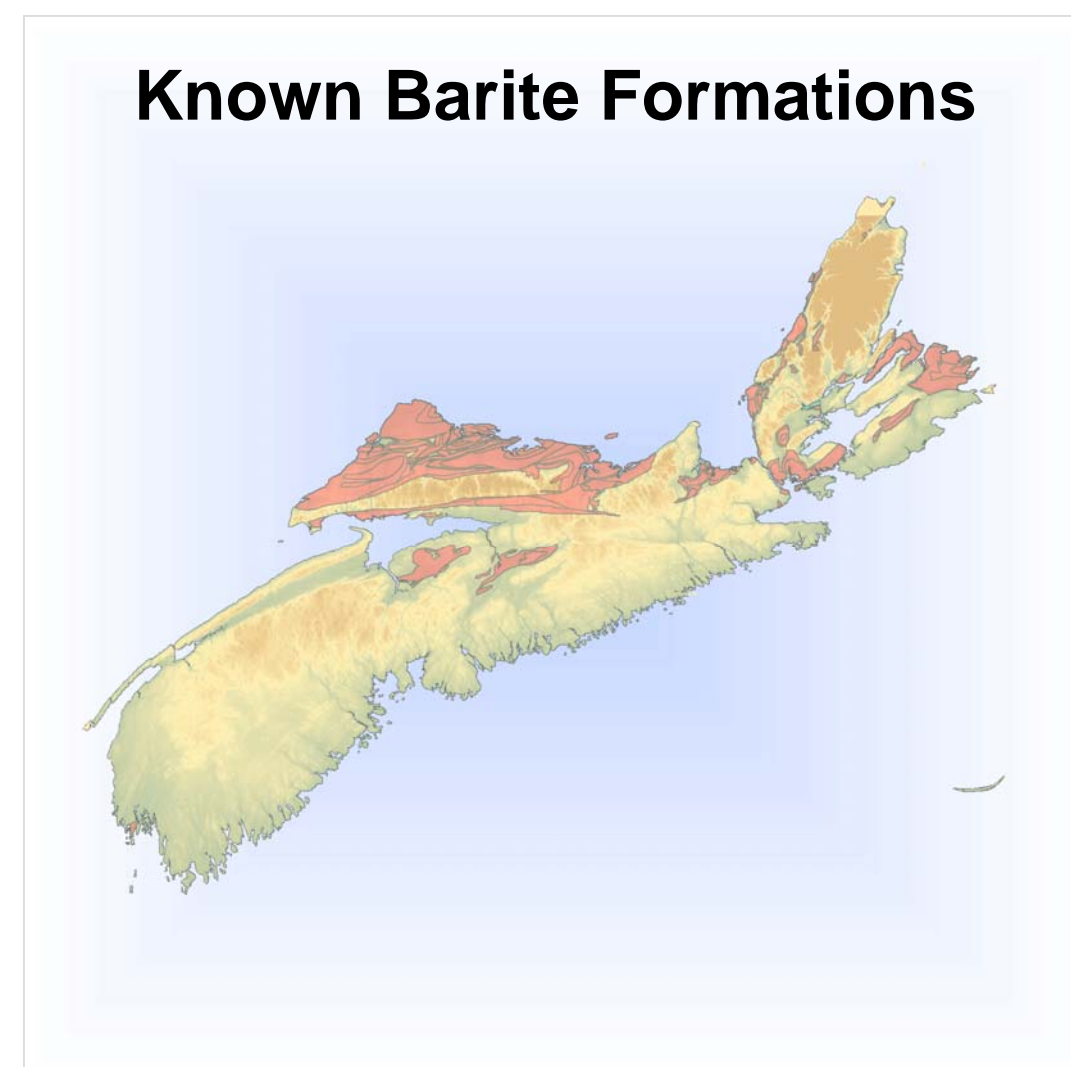
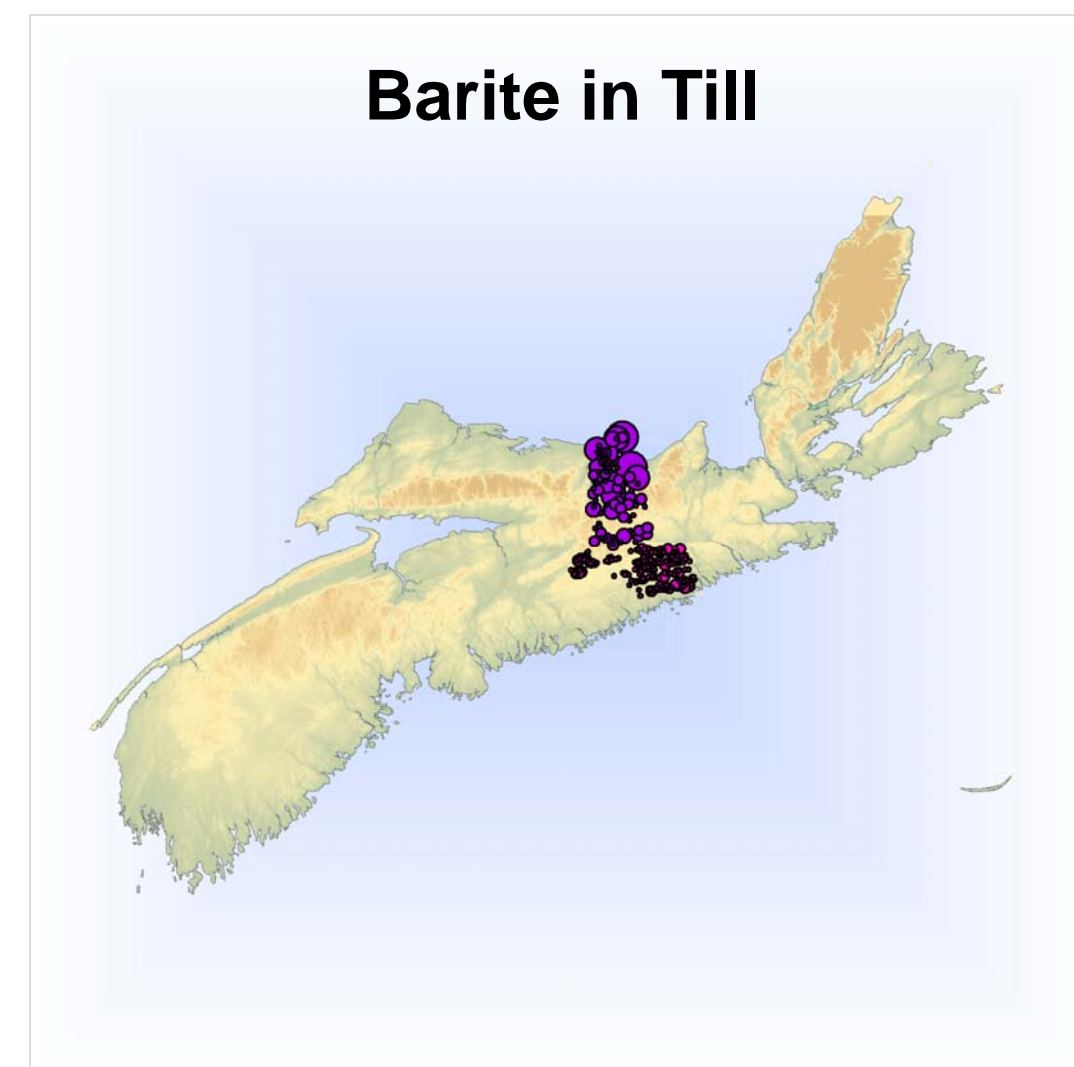
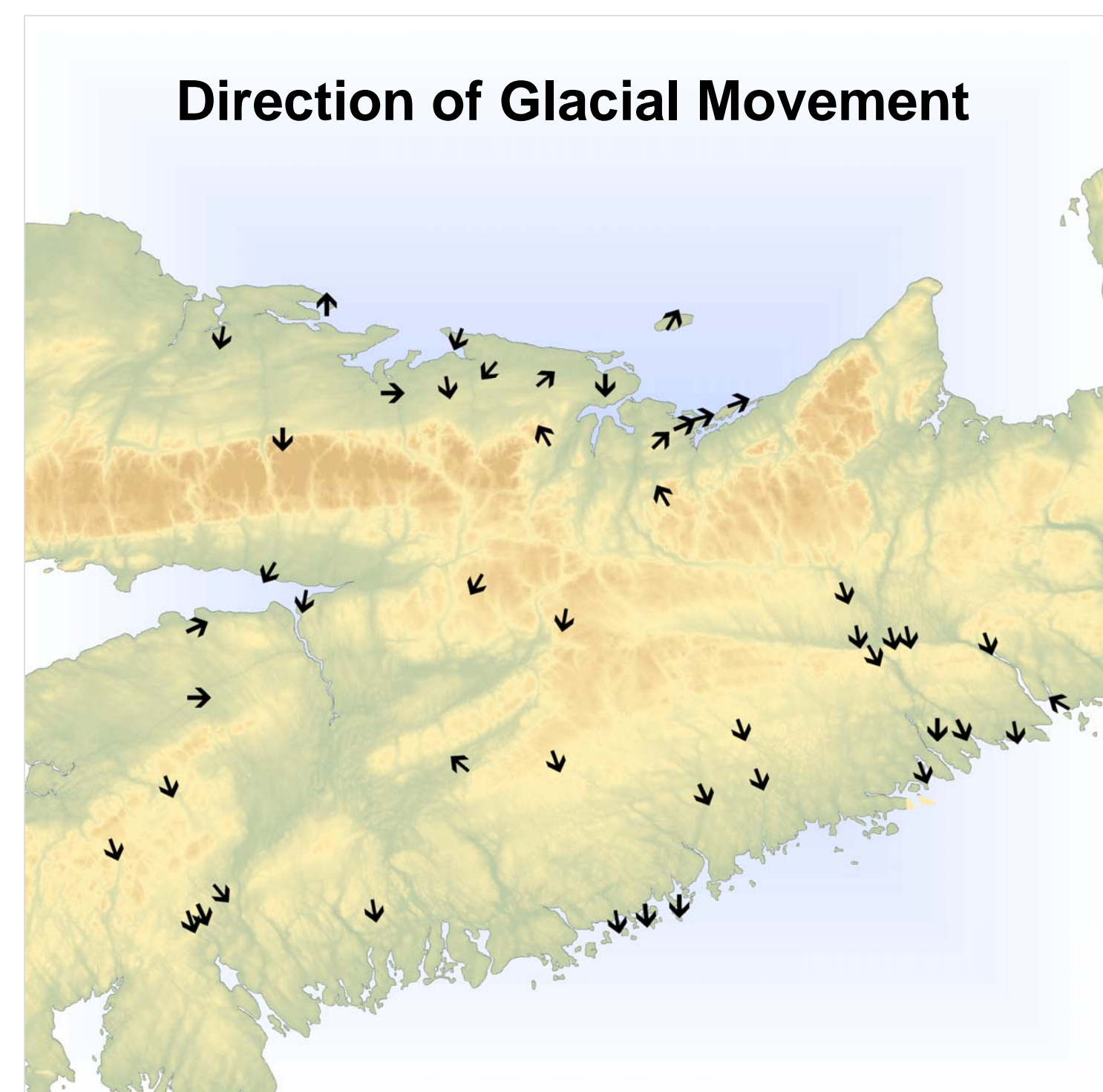
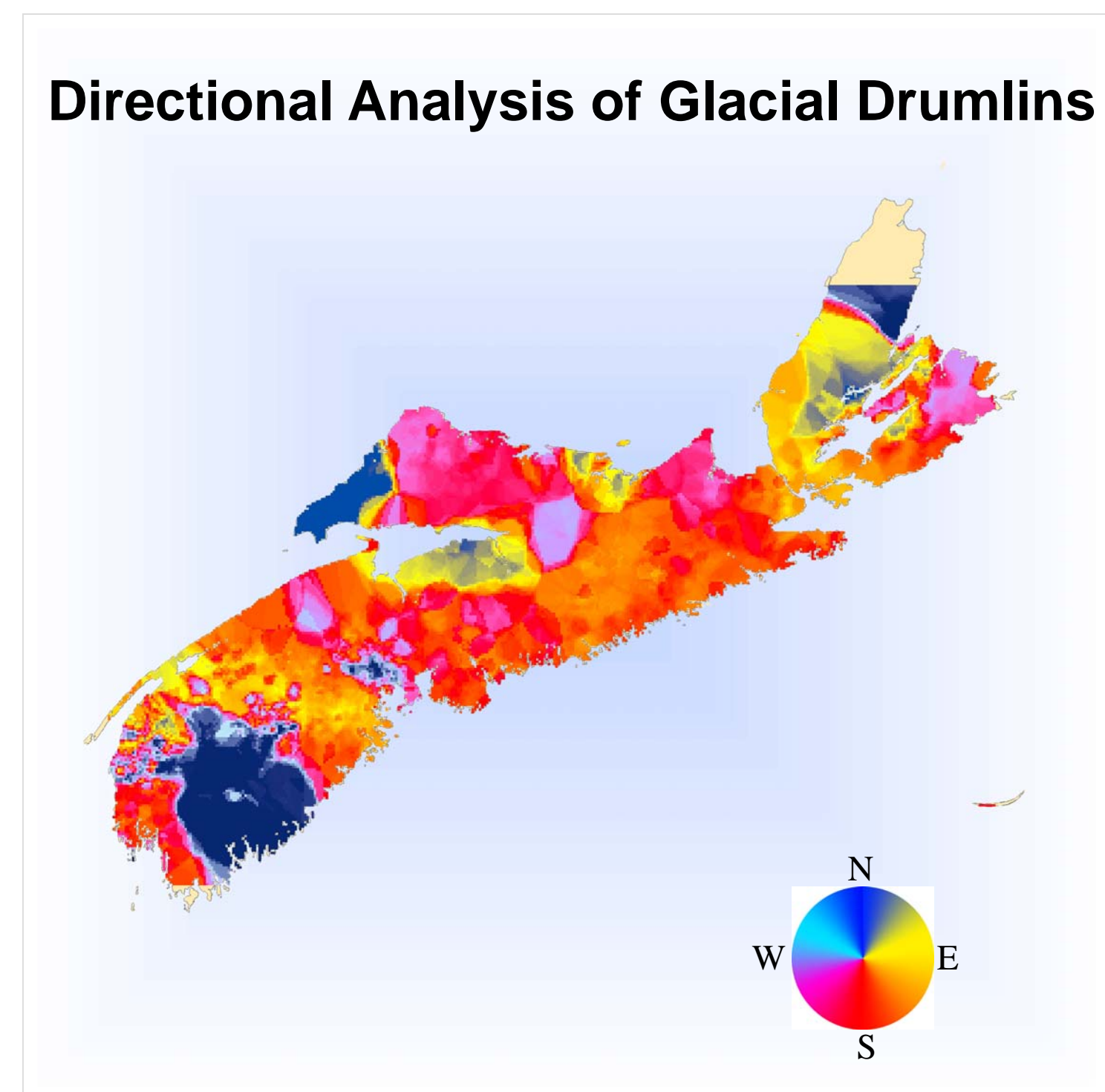
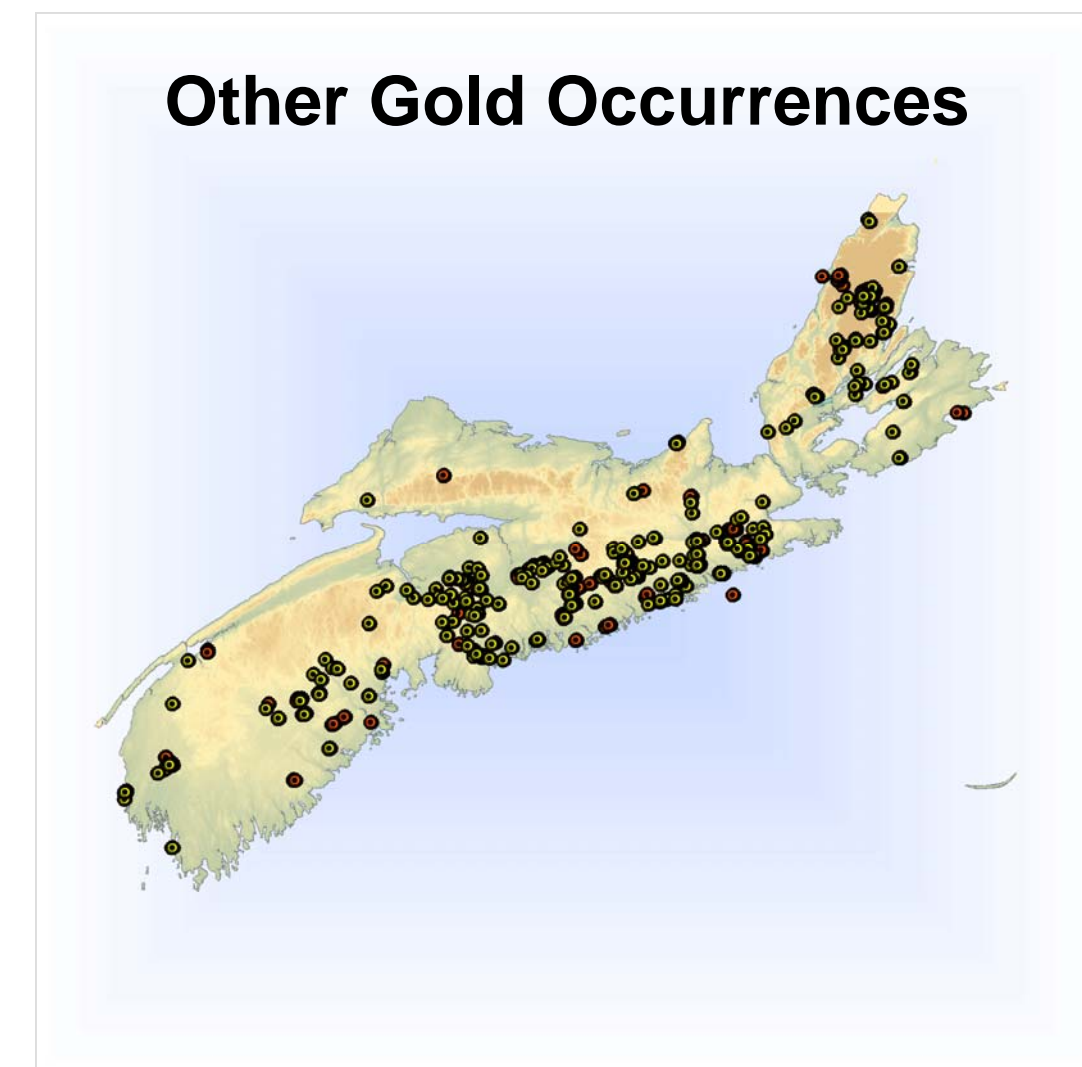
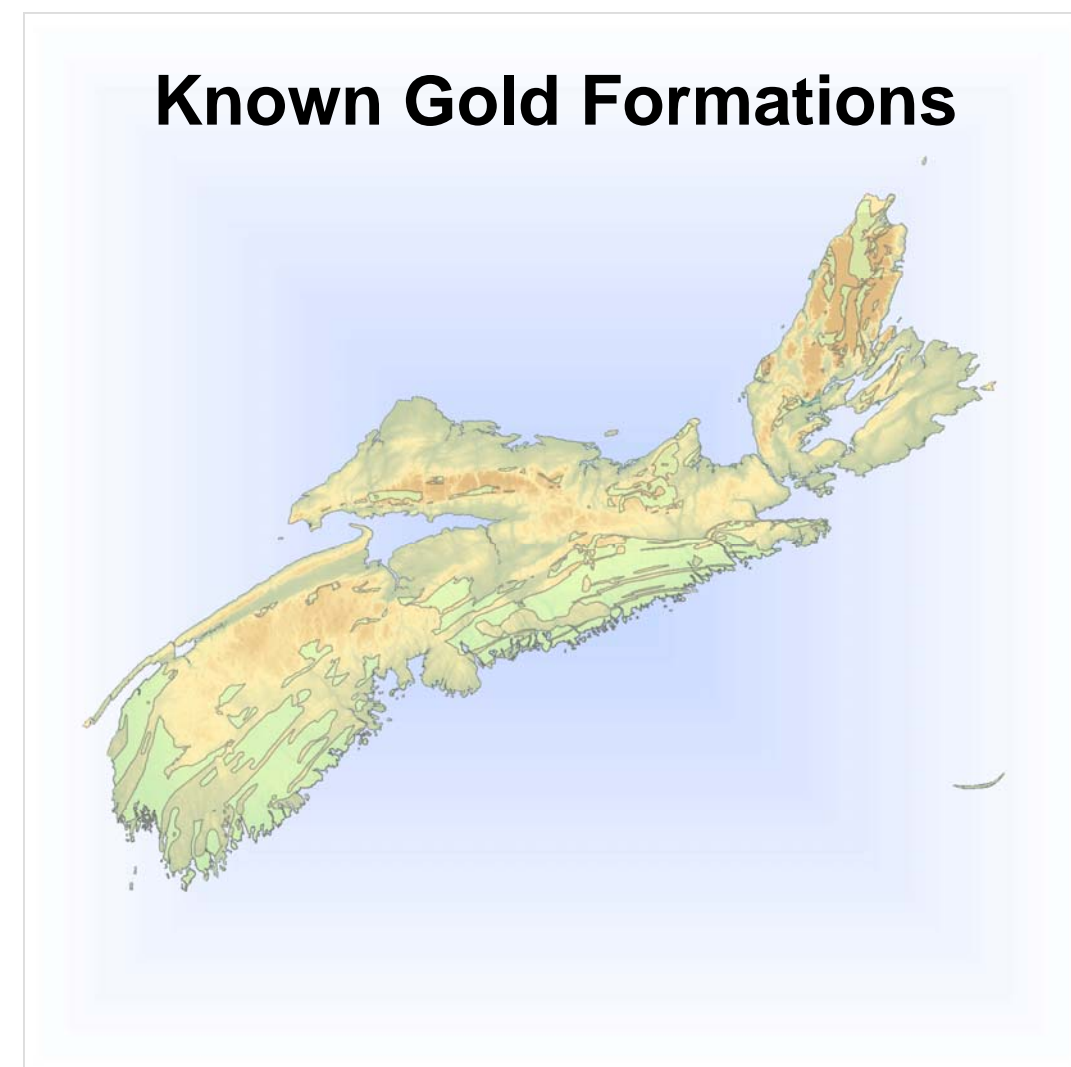
Introduction

Drift prospecting is the technique of tracing till with economically valuable minerals (EVMs) from the previous glaciation back to an outcrop or bedrock containing the EVMs. By taking till geochemistry samples in conjunction with knowledge of glacial direction, one can trace the occurrence of EVMs along the path of the once advancing glacier. Two notable EVMs found in Nova Scotia are gold and barite, and the province actively mines barite. The aim of this project was to analyze till data and apply the known direction of the glacier to trace gold and barite till back to their most likely source.

Methods

The principal means of identifying glacier flow direction is through drumlin directions and bedrock striations. A flow direction raster was created by interpolating a point layer of drumlins by their known azimuth. The direction raster was converted into a polygon shapfile and classified into N, NW, W, SW, S, SE, E, and NE. Using Hawth's Tools (by Spatial Ecology), a centroid point was created for each of these generalized polygons. These points were then symbolized as arrows. The area of focus chosen was Central Nova Scotia because both gold and barite in till can be found along with abundant glacial directional data.

The available till data for barite comes from two independent surveys conducted in the 1980s. Only one of the two surveys took measurements of gold in till. The two point layers were classified based on amount of EVMs in the till. The till was then related to formations that are known to contain the mineral and specific occurrences that have commodity levels as determined by the Mineral Resources Branch of the Nova Scotia Department of Natural Resources.



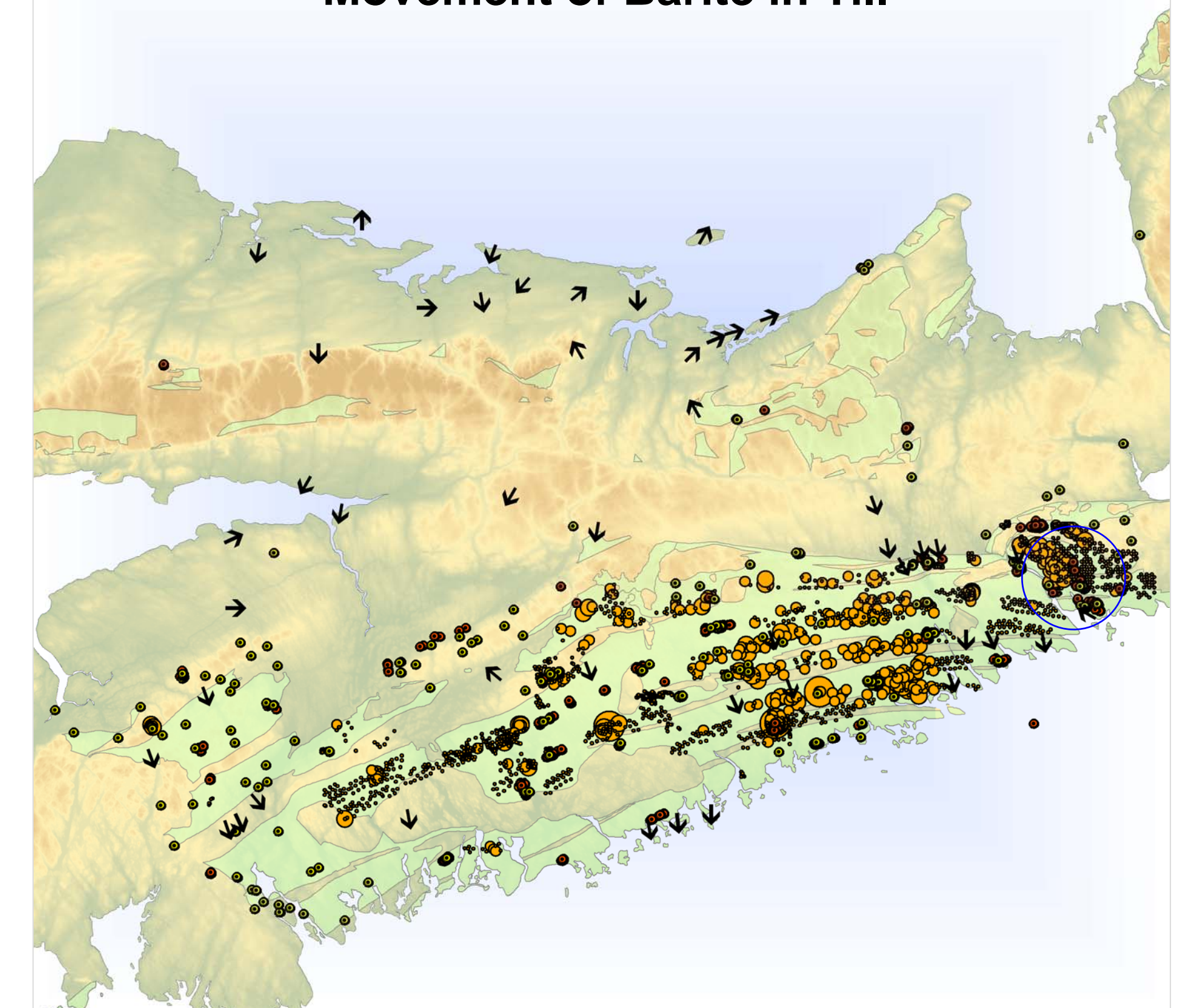
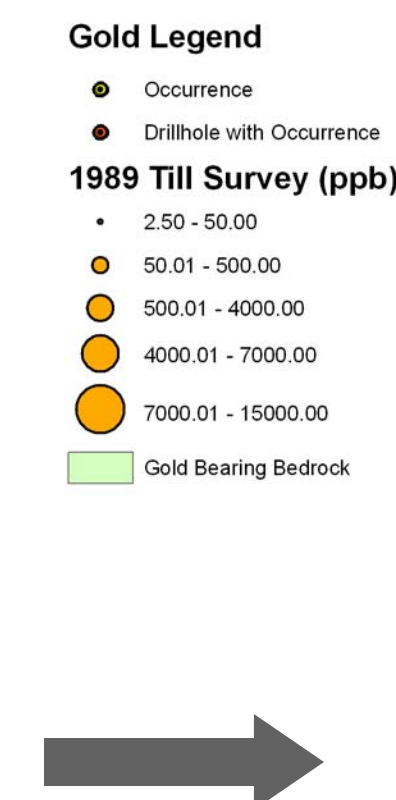
References

Ravenhurst, C. E. (1989). Formation of Carboniferous Pb-Zn and barite mineralization from basin-derived fluids, Nova Scotia, Canada. *Bulletin of the Society of Economic Geologists*. 84, 1471-1488.

Sources

The Mineral Resources Branch of the Nova Scotia Department of Natural Resources (<http://www.gov.ns.ca/NATR/MEB/pubs/pubs3.htm>), the USGS International seamless data server (<http://seamless.usgs.gov/index.php>), Geological Survey of Canada's Paleovegetation Maps of Northern North America (http://geopub.mcan.gc.ca/moreinfo_e.php?id=215634), and SpatialEcology.com (for Hawth's Tools)

Movement of Barite in Till



Results and Analysis

For gold, the till from Central Nova Scotia appears to have travelled SSE overall. There are isolated areas where striation direction indicates that the glacier appears to have moved in a different direction as a result of a elevation change, for example, in the area north of the eastmost generalized direction arrow (circled in blue). In those cases, the till appears to have been deposited at the foot of the steep slope. The major concentrations of gold till do not appear to have travelled more than 7-10 km, but this would need to be verified with more precise data from field work. The gold occurrence data also suggests that there is further gold bearing till offshore from when sea level was lower. If the gold travelled more than 10 km, the likelihood is that there are submerged gold bedrock sources contributing.

Both gold and barite till seem to conform to a 7-10 km range of distance from known sources. As a result, there appear to be undocumented sources for some of the northernmost barite till. The highest documented concentrations of the barite till include several on Pictou Island and the Carboniferous shore to the southwest of the island. A possible source (indicated by the pink X) for these concentrations appears to be a lower elevation offshore between the nearest Carboniferous shore and the island that is 7 km away from both. The arrows representing glacial direction appear to confirm this. The south slope barite till could be a result of the source of barite located on the high elevation divide between south pointing drumlins and north pointing drumlins.

Acknowledgements

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Movement of Barite in Till

