GLACIAL/HOLOCENE GEOMORPHIC FEATURES STONY BROOK, SETAUKET AND PORT JEFFERSON, NY

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The landscape holds important clues to the geological land forming processes of the past. Today, many land features are hidden by vegetation and modern-day development. To analyse and identify the land features of the Stony Brook, Setauket and Port Jefferson area, the contours from quadrangle maps were copied. The resulting map was used to locate landforms and model the processes involved in their formation.

METHOD AND MATERIALS

The Port Jefferson and St. James 1955 United States Geological Survey 7.5 minute quadrangle maps, were traced onto semi-transparent material. These maps have a scale of 1:24 000, with contour intervals of 10 feet. These older topographic maps were chosen because there was less development than on more recent maps. The 10 feet contour intervals meant that even the small changes in elevation were detected. The resultant topographic map can be seen in figure 1.

Using the contours as a guide, the courses of streams were estimated (figure 2). Other overlays drawn include one of the ridges and kettle-holes seen and an estimate of the landform prior to erosion by rivers and streams.

RESULTS

Many features stand out, the most prominent is the moraine, with an elevation of about 200 feet forming an arc spanning from Port Jefferson to Stony Brook (figure 1 & 2). The moraine is of higher elevation than the surrounding land, and has a ridge and kettle-hole terrain. At Port Jefferson, the moraine is narrow, 500m wide, and ends abruptly. Near the Stony Brook campus the moraine is much wider (1500m) and diverges.

The traced contours clearly show evidence of drainage features. The courses of many of the streams have been plotted (figure 2).

Spreading out, southwards from Port Jefferson, there appears to be an outwash fan (figures 1 & 2). The fan has a relatively high elevation (190 ft) at Port Jefferson Station, it slopes gently southward. Within the fan, there are several kettle-holes.

North of the end moraine, the ground is irregular and hilly. The harbours, such as that of Port Jefferson, are surrounded by land that appears to be crumpled and has a steep gradient (figure 1).

DISCUSSION

The method of reproducing a topographic map using the contours alone has proved a simple, but effective exercise in observing the land features of the area. Landforms, hidden by vegetation and development, stand out and so identification of the features was made an easier task. From this stage, models can be put forward as to the land forming processes involved.

The contours of the Stony Brook moraine show a steeper southward slope than the northward slope, and the terrain consists of inequal ridges and kettles(figure 1). Comparison with others, suggests that the moraine structure is typical of a push moraine, as recognised by Aber et al (1995). A push moraine is formed by the deformation of unconsolidated sediments in front of the glacier. The formation of the push moraine begins with the deposition of outwash sediments. The outwash deposits are then thrust up, in sheet-like layers by advancing ice.

The stream valleys seen north of the moraine are evidence of erosion by the melt-water sub-glacially or of a retreating or stagnant glacier, as there is no water in most of these valleys today. Tracing the course of the river valleys, we found that many roads follow these routes today. The streams north of the moraine are short in length with few tributaries, whereas, streams south of the moraine are much more developed features, longer in course and have tributaries. These streams appear to drain into one area, possibly a lake.

The shape and form of the hills and harbour at Port Jefferson, is an example of a hill hole pair (figure 1; Aber et al 1989). In hill hole pair formation, a hill is formed at the front of the glacier from ice-thrust material. Behind the front a depression of similar size and shape is usually found.

REFERENCES

Aber, J.S., Croot, D.G. and Fenton, M.M. (1989). Glaciotectonic landforms and structures. Kluwer Academic Publisheres. Netherlands.

Aber, J.S., Bluemie, J.P., Brigham-Grette, J, Dredge, L.A., Sauchyn, D.J. & Ackerman, D.L. (1985). Glaciotectonic map of North America. Geological Society of America Maps and Chart Series. MCH 079. 1-6.

Figure1. Topographic map of the Port Jefferson area.
One inch equals one mile.

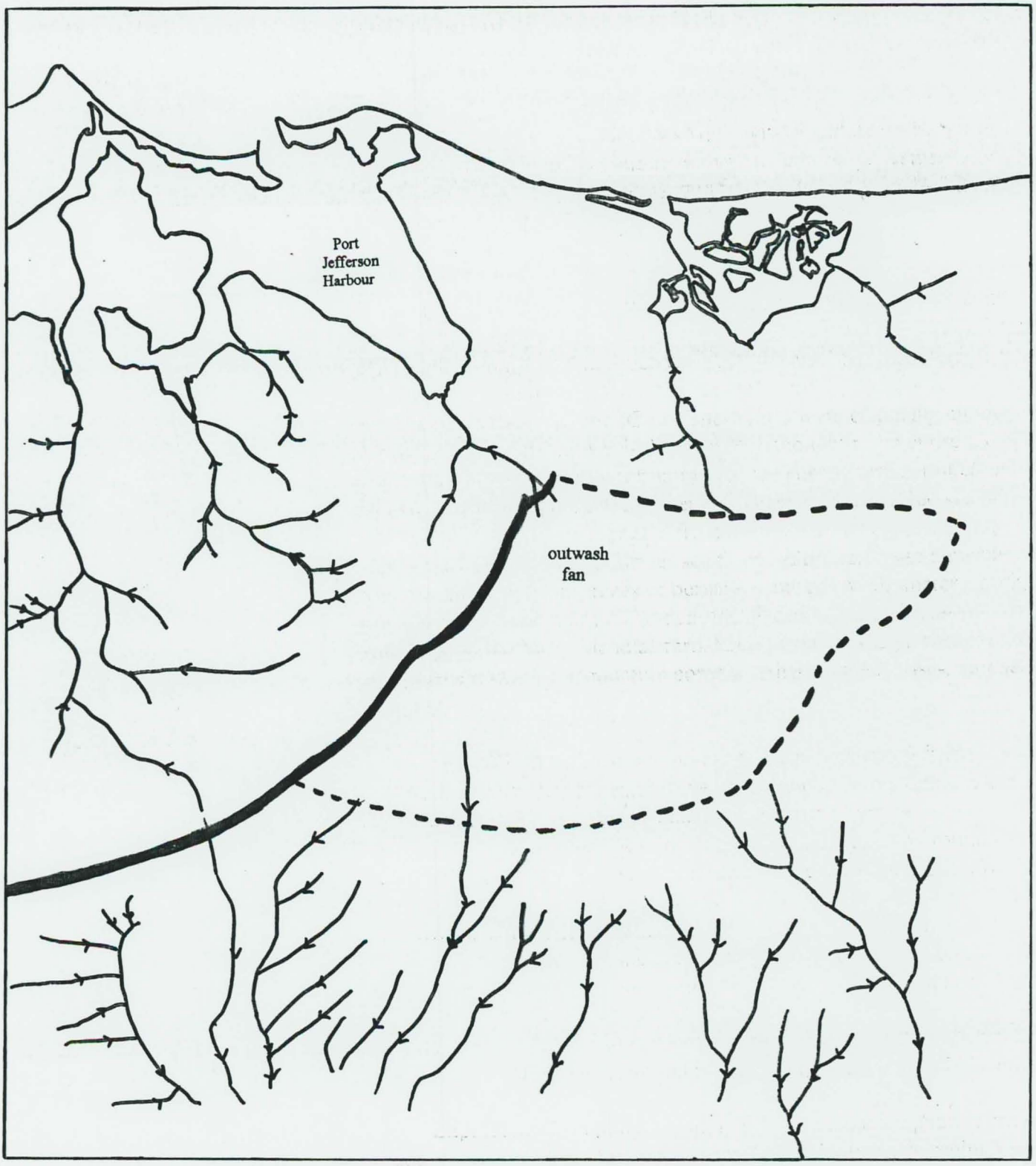

Figure 2. Drainage features of the Stony Brook, Setauket and Port Jefferson area.
——→—— stream valley (arrow indicates direction of flow)
——— front edge of moraine