GLACIAL-MARINE SEDIMENTS OF THE INNER CONTINENTAL SHELF AND SEACOAST REGION OF NEW HAMPSHIRE

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The glacial-marine sediments of the inner shelf differ from those of the seacoast region below the marine limit (about 30m near the Massachusetts border and 10m near New Hampshire). Differences are only in part due to methods of study (acoustic reflection and cores on the shelf; wall samples and outcrop on land).

Glacial sediments on land are more complex. Ice-contact deltas of sand and gravel dominate the landscape. They occur in closely spaced rows marking successive edges of the ice. In contrast there are no such deposits on the shelf indicating that calving was faster, on a larger scale or unaccompanied by abundant melt water.

Away from the delta near the marine limit, the glacial-marine deposits have a four-part stratigraphy. The base facies is thickest, followed by sand with gravel and mud (proximal outwash). The second facies is mud (distal outwash). The third is interbedded mud and thin sand. The top facies is small storm deposits as the sediments settle out and harden (in the high post-glacial sea). The final facies is a sand sheet found within a few kilometers of the marine limit (variously interpreted as "outwash" or "glacialmarine"). Draping of the glacial-marine deposits is slight to absent and decreases upward.

NORTHEASTERN SECTION

SAND AND GRAVEL DEPOSITS ON THE INNER CONTINENTAL SHELF OF NEW HAMPSHIRE

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Mapping and evaluation of sand and gravel deposits were the purposes of this study. Locations, volumes and textures were determined from acoustic surveys, side-scene sonar surveys, grab samples and vibrocores.

The deposits lie in water depths of less than thirty meters where they overlap bedrock or an unconformity cut into sandy glacial-marine mud (Presumpscot Formation). The deposits occur in three distinct forms. Shoreface wedges extending seaward from modern beaches are one type. Another type includes low-standing sheets and mounds. A third category, composed largely of broken shells, lies landward of the rocky Islets of Shoals. Maximum sand thicknesses range from ten to fifteen meters.

The sands are mainly very fine to fine sand (trapped on 44 to 46 sieves). The surface sands fine seaward and generally are coarser than the inner shelf sediments. Glacial is rare and also decreases seaward, the dominant direction is onshore. Onshore, sand content decreases, and shoreface wedge texture is replaced by other sedimentary units and the preglacial unconformity beneath them all suggest that the sand is derived from the sand facies on New Hampshire and in the coastal erosion. A Holocene age is implied by location with respect to the present position of the glacial-marine and interglacial deposits that fill a valley cutted by the Devonian shale bedrock.

The glacial deposits are dominated by silty clay tills which have very low hydraulic conductivity. The interglacial deposits are somewhat coarser grained but still have low hydraulic conductivities. The site has not been studied extensively for more than 10 years. Recent studies have focused on the weathered till, which comprises the upper 300 cm of the soil column and is more permeable than the unweathered till below it as a result of extensive desiccation fracturing.

GEOHYDROLOGIC CHARACTERIZATION FOR ENVIRONMENTAL ASSESSMENT OF LOW-LEVEL WASTE DISPOSAL AT THE WEST VALLEY DEMONSTRATION PROJECT

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The site of the U.S. DOE West Valley Demonstration Project is a closed nuclear fuel reprocessing plant, high-level radioactive waste management facility, and low-level waste and solid waste areas. The site is located on a fairly level plateau which is underlain by a sequence of glacial, interglacial and postglacial deposits that fill a valley cut by the Devonian shale bedrock.

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GROUNDBASED GLACIAL AND A GLACIAL LAKE - WILLIAMSTOWN, MASSACHUSETTS

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To characterize the hydrogeology of the Hoosac River Valley in northeastern Massachusetts, ISL installed 27 monitoring wells, performed extensive water quality and sediment grab analyses, and conducted a 74 hour aquifer test. Our study was performed to determine the potential impact of several solid waste disposal sites on existing and proposed municipal wells.

This investigation delivered three unconsolidated, hydrogeologic units beneath the glacigenic deposits: 1. A shallow water table aquifer in channel and overbank deposits of the present and ancestral Neoclassic (up to 12m of sand, gravel, and silt). 2. A glacial outwash aquifer - rhysitic deposits of glacial lake Basin (20 cm to 4m of silt, clay, and fine sand). 3. A deep confined aquifer in glacial-lacustrine and subaqueous ice contact deposits (5 to 7m of sand and rounded gravel). Deep aquifer characteristics were determined from pumping tests and laboratory data. In most of the study area, static water levels in the deep aquifer are more than 15m above ground surface. Vertical gradients under nonstressed conditions range from 0.345 to 0.279. We determined a conservative transmissivity of 25,000m2/yr and a coefficient of storage of 10-4. Triaxial permeabilities of fine grain samples of the aquifer range between 10-2 to 10-4cm/sec. Grain size analyses indicate that the aquifer consists of a major drainage-oriented Lake Basin. Where the confining unit loses its integrity, ground water exists in a single water table system.