STATISTICAL APPLICATIONS TO CHANNEL MORPHOLOGY FOR A BEDROCK STREAM IN CENTRAL VERMONT

CANAVAN,..WILLIAM A., Leggette, Brashears & Graham, 1123 Rte. 52, Fishkill, NY 12524; KOCHEL, R. Craig, Bucknell University, Lewisburg, PA 17837

The New Haven River in central Vermont is a high gradient bedrock stream. The influence of bedrock geology and associated features upon channel morphology was investigated along a reach of the river characterized by abrupt changes in sediment and slope. Morphological variables measured at sections of the river dominated by either bedrock of alluvial features were useful for determining the influence of bedrock on channel morphology.

Statistical analysis showed that jointing exerts controls on channel orientation. Field observations indicated that large scale structural features disrupt pool and riffle patterns at their intersection with the stream channel, and pool and riffle spacing did not occur at the typical frequency.

Results of the investigation indicate that slope is responsible for controlling the spacing of pools. As slope decreases downstream, pool-to-pool spacing increases. Bedrock indirectly influences pool-to-pool spacing where it causes abrupt changes in the gradient of the channel.

Principal Components Analysis on 8 independent morphologic variables was successful in isolating definable variations between bedrock and alluvial sections of river. Models were developed that described the morphology of the channel correctly. The success of PCA in differentiating between channel types is validated by field observations.

Discriminant analysis was applied using the results of PCA as the data set and resulted in almost perfect distinction of bedrock and alluvial sections of river.