Geophysical Research Abstracts, Vol. 8, 04004, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04004

Factors influencing populations of the endangered freshwater pearl mussel MARGARITIFERA MARGARITIFERA in the River Ehen, UK

C.N. Gibbins (1), M.R.Young (2), D. Pokrajac (2), C. Soulsby (1)

(1) Department of Geography and Environment, School of Geosciences, University of Aberdeen, AB24 3UF, Scotland, UK (e-mail: c.gibbins@abdn.ac.uk), (2) University of Aberdeen, AB24 3UF, Scotland, UK

The freshwater pearl mussel M. margaritifera is endangered across its Holarctic range. Consequently, populations remaining in Scotland and other parts of Northern Europe are of great international importance. Over the last 100 years, many mussel populations have declined or disappeared completely. A number of factors have been implicated in this decline, including exploitation by pearl fishermen, poor water quality, 'smothering' of riverbeds by fine sediment and declines in salmonid fish populations. Changes to river flow regimes are considered particularly important because they can affect instream hydraulic conditions. Changes to instream hydraulic conditions may affect mussels directly (e.g. velocities and shear forces become unsuitable) or indirectly (e.g. velocities are reduced and the deposition of fine sediment is increased). Flow regimes are also important in influencing channel geomorphic characteristics and the transportation, deposition and sorting or river-bed sediments. Thus, flow regime changes may affect the distribution of sediments required by mussels at various stages of their development.

This poster presents information on distribution and abundance M. margaritifera in the regulated River Ehen, Cumbria, UK and examines the factors responsible for observed patterns. Mussel populations were found to be ageing, with little or no recruitment of juveniles. Available data suggest that salmonid fish, the host of early mussel life stages, occur at densities much lower than typically found in rivers with recruiting mussel populations. Three-dimensional computational fluid dynamics models suggest that the compensation flow from the reservoir that regulates the Ehen produces

hydraulic conditions that may be suboptimal for mussels. Poor riparian land management, leading to the input of fine sediments, may be contributing to poor instream habitat quality. Conversely, much of the river suffers from inappropriate bank stabilisation measures which prevent the river from establishing its natural, meandering planform. Thus, riparian and bank management results in channel disequilibrium. Overall, the data suggest that a number of factors interact to affect pearl mussel populations in the Ehen.