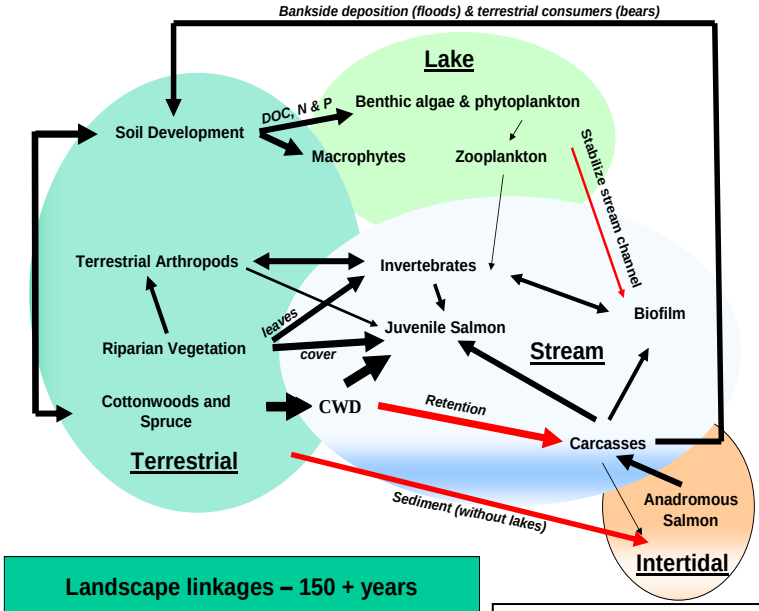
Terrestrial invertebrates and their subsidies to stream communities across floodplains in watersheds of different ages in Glacier Bay, Alaska.

Supervisors: Prof. Alexander Milner , Dr. Jon Sadler and Dr. Scott Hayward.

Rapid glacial recession within Glacier Bay National Park, Southeast Alaska, presents a unique opportunity to study the development of stream communities within watersheds of different ages across a recently deglaciated landscape with a spatial scale of 11,000 km^2 providing a temporal scale of 220 years. Glacier Bay is a natural laboratory which can be used to predict how aquatic ecosystems respond to the interaction of landscape geomorphology, climate change and ecological factors. Biological colonization and community development in Glacier Bay occurs within a primary successional framework where no remnants of the previous biotic community remain. However, no single factor or mechanism fully explains plant primary succession processes at Glacier Bay (Milner et al. 2008). Moreover, the process of succession remains poorly understood in aquatic environments or in the development of riparian marginal environments and their macroinvertebrate communities (Sadler et al., 2004).Recent work has highlighted the importance of the two-way interaction of aquatic and terrestrial food sources to stream and riparian communities, where both terrestrial to aquatic (Kawaguchi & Nakano, 2001; Kawaguchi et al., 2003; Nakano et al., 1999) and aquatic to terrestrial (Murakami & Nakano, 2002; Sabo & Power, 2002) 'food web subsidies' are now thought to be important in determining community structure in streams. Glacier Bay offers an un-paralleled opportunity to examine how these subsidies effect the rates and timing of successional changes in both stream and riparian ecosystems. In addition no previous study has examined the evolution of floodplain terrestrial communities on floodplains of different ages and stages of development so this would be the first study to link this development with the framework of linkage to stream communities. The student would attempt to quantify the linkages between the terrestrial and the stream environment as outlined in the figure for 150+ years shown above.



From Milner et al. 2007

The research student will benefit from designing a field programme and working in a multidisciplinary team in a remote area where conditions can be challenging and rewarding. The student will participate in a large and active graduate research school within the School of Geography and Environmental Sciences. The research programme will provide the student with training in hydrology; ecology; remote fieldwork and desk-based research methods; and analysis of environmental data.

For more information please contact Gretchal Coldicott (g.coldicott@bham.ac.uk) or the potential supervisors Alexander Milner (a.m.milner@bham.ac.uk) or Jon Sadler (j.p.sadler@bham.ac.uk)

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