NUS National University of Singapore

Department *of* Biological Sciences
Biodiversity and Ecology Journal Club
Seminar Announcement

Scale dependent effect of fine sediments on the structure and function of temperate stream macroinvertebrates.

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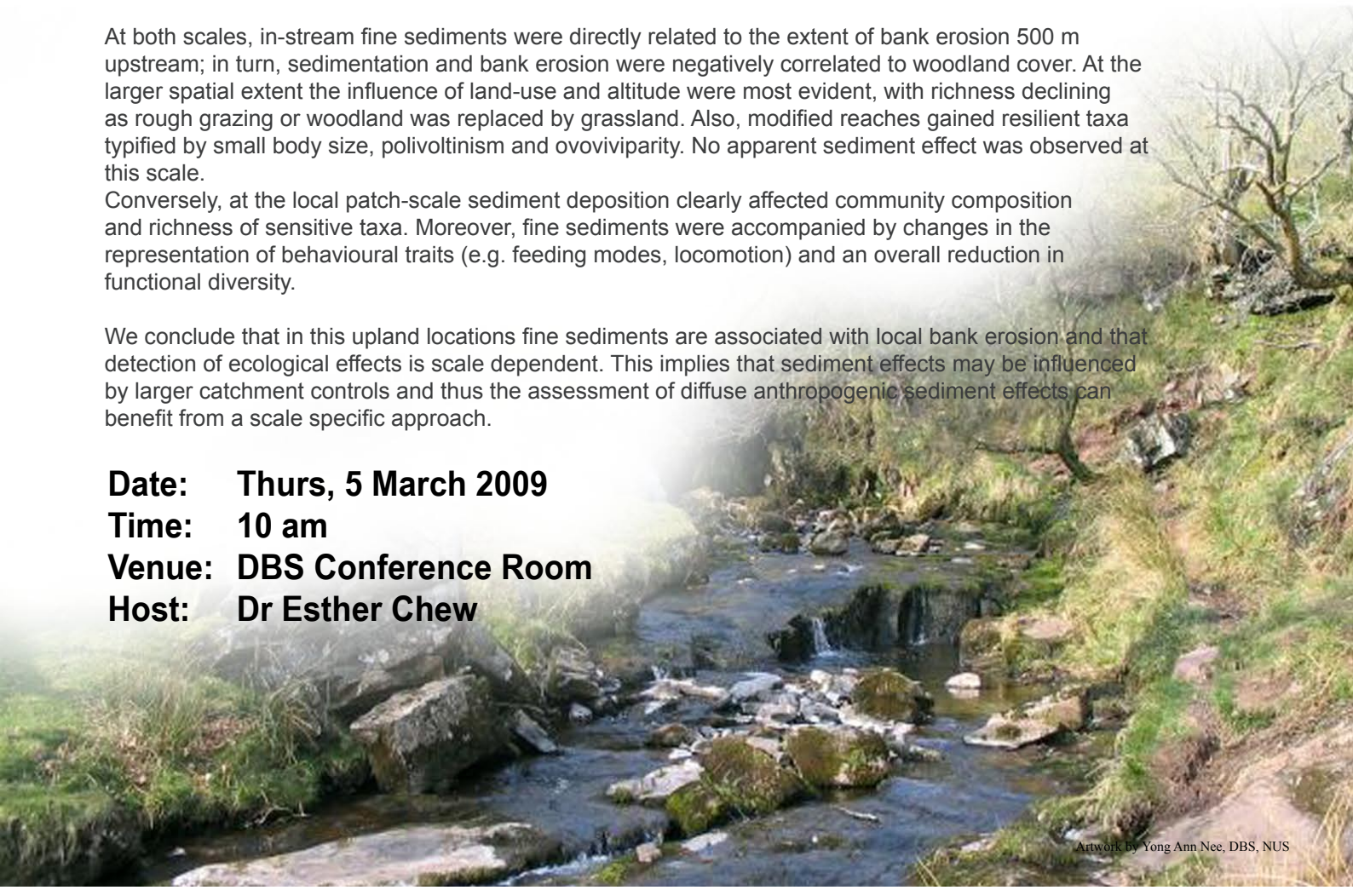
Catchment agriculture, urbanisation, forestry and miming can increase sediment delivery to streams and rivers and alter sediment quality with profound consequences for aquatic organisms.
Sediment effects are manifold and organisms at all trophic levels are affected, for example through a reduction of available light for primary producers and visual predators, alteration of substratum structure and habitat quality for benthic organisms, decline in feeding efficiency of filter feeders and grazers and reduced oxygen supply to salmonids eggs via interstitial occlusion.
In reality, quantitative understanding of the mechanisms involved and the sensitivity of organisms is poor, for many reasons. First, anthropogenic alteration of sediment regime range from whole catchment modification (agriculture) to local habitat alteration (livestock trampling), so that exact sediment sources are seldom identified readily. Second, over large spatial extent, ecological effects can be masked by natural variability.

In this study we employed two consecutive surveys at different spatial resolutions to understand the apparent causes and extent of sediment deposition in the Usk cathment, Wales (UK), and to identify the scale at which ecological effects on stream macroinvertebrates are evident.

At both scales, in-stream fine sediments were directly related to the extent of bank erosion 500 m upstream; in turn, sedimentation and bank erosion were negatively correlated to woodland cover. At the larger spatial extent the influence of land-use and altitude were most evident, with richness declining as rough grazing or woodland was replaced by grassland. Also, modified reaches gained resilient taxa typified by small body size, polivoltinism and ovoviviparity. No apparent sediment effect was observed at this scale.
Conversely, at the local patch-scale sediment deposition clearly affected community composition and richness of sensitive taxa. Moreover, fine sediments were accompanied by changes in the representation of behavioural traits (e.g. feeding modes, locomotion) and an overall reduction in functional diversity.

We conclude that in this upland locations fine sediments are associated with local bank erosion and that detection of ecological effects is scale dependent. This implies that sediment effects may be influenced by larger catchment controls and thus the assessment of diffuse anthropogenic sediment effects can benefit from a scale specific approach.

Date: **Thurs, 5 March 2009**
Time: **10 am**
Venue: **DBS Conference Room**
Host: **Dr Esther Chew**



Artwork by Yong Ann Nee, DBS, NUS