

Ex-Jobb possibilities at the SLU Department of Environmental Assessment working with the “Forest Catchment Science” research group.

Forest Harvest Impact on Mercury in Surface Waters: Testing the “groundwater level” hypothesis.

“Water is a mirror of the landscape” and in Sweden that mirror shows mostly forests. But what happens when we harvest the forest? Plans to dramatically increase forest growth and harvest for biofuels have renewed research on the aquatic effects of forest harvest and how to mitigate them.

Changes in the amount and pathways of water flow are believed to underlie many of the environmental affects created by forest harvest, including erosion, pulses of nitrate in runoff, and long-term increases in mercury loading to aquatic ecosystems. In a paired catchment study near Bjurholm, in Västerbotten, two entire catchments have been harvested in 2006. The concentrations of mercury in runoff, a serious pollutant, have increased. Is this due simply to rises in the ground and the groundwater level after harvest? An ex-jobbare is sought to test this hypothesis, with a focus on modelling groundwater levels before and after harvest. As data for the project, a month of field work will complement previous measurements. Additional project employment during the summer of 2009 is possible.

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Do Riparian soils define the chemistry of runoff water in the forest landscape?

Our research group has hypothesized that flow paths through riparian soils are the major determinant of water chemistry (including mercury, trace metal and carbon concentrations) in the forest landscape. If this is true, then it will help us predict how forest management and climate will influence water chemistry. To test this hypothesis, a riparian “observatory” was established in the Krycklan Catchment during the summer of 2008. (www.crew.sek.slu.se). During 2009, the soil water chemistry and hydrology of the 15 riparian study sites in the observatory will be observed and analyzed to see whether they confirm the “riparian hypothesis”. An ex-jobbare is sought to spend a month in the field (Vindeln, Västerbotten) collecting data, and then analyse the results. Additional project employment during the summer of 2009 is possible.

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Continuous water chemistry in headwater streams: How much more can it tell us about carbon balances in the forest landscape?

Researchers are trying to determine whether boreal forests are a source or sink of carbon in the global carbon cycle. “The aquatic conduit” for carbon has been receiving increasing attention in this work – that is the amount of carbon leaving the landscape in runoff water. One challenge in defining this component of the carbon balance is the possibility for rapid changes in carbon flux and concentrations in conjunction with episodes of high flow. Recent advances in instrumentation may make it possible to continuously register both the organic and inorganic carbon content in runoff. An ex-jobbare is sought to run a field study using new sensors for continuous registration of organic and inorganic carbon in runoff during the summer of 2009. The work would be located in the Krycklan Catchment ((www.crew.sek.slu.se) near Vindeln.

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Aqua Incogita: Defning the output of dissolved carbon from headwaters

90% of stream length is in headwaters streams, but there is no systematic estimate of the chemistry of these streams. Several years of work have gone into seeking relationships between downstream chemistry and headwaters, supported by GIS. Now an Ex-jobb could bring this work to fruition by making an estimate of dissolved carbon outputs from all forested headwaters in Sweden. This will be the first test of whether “Aqua Incognita” can be defined. It will also provide useful information on Sweden’s carbon balance, since export of organic carbon from soils is not included in regional carbon balances. This aquatic term of the C balance has been missing due to lack of data, which this project could provide.

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