On the productive alluvial floodplains of the lower Skeena River, past logging with no follow-up treatment has, in many cases, resulted in the establishment of non-commercial, complex, multi-storied brushfields. To establish a productive coniferous plantation on these sites, rehabilitation is usually necessary. The numerous rehabilitation techniques available all have a common goal: the reduction in light competition by the removal of the deciduous canopy. The intensity of these treatments varies from the elimination of the upper canopy (i.e., hack and squirt and girdling) to total removal of all the biomass (i.e., burning and blading).

To evaluate the most effective of these stand conversion methods, John Pollack has established a benchmark research trial (FRDA Project 2.6) along the Skeena River between Terrace and Prince Rupert. This project compares the effectiveness of 10 stand conversion treatments, which include combinations of burning, mechanical and chemical options. The project was initiated in 1986 and all the treatments were completed during the summer of 1987. This study, the largest of its type in Canada, is multi-disciplinary and along with the vegetation assessments includes studies in ecology, pedology, fire behaviour, wildlife and hydrology. FRDA Project 2.26 covers the hydrology component of this project and studies the impacts of the various treatments on the hydrological characteristics of the site. This memo is intended to provide an update on the progress of Project 2.26 and also some preliminary results.

Included in these hydrological assessments are the effects of the various treatments on soil climate (i.e., soil temperature and soil moisture), on soil bulk density (i.e., compaction from the bladed treatments), and on soil infiltration rates. Also monitored will be the effects of spring flooding on surface movement of the herbicide glyphosate.

Characteristically, these fluvial soils have histories of very recent flooding and as a result are distinctly layered. The thin surface organic layer (1-2 cm) is generally underlain by a 15-20 cm layer of fine silt (overbank deposits). The nature of these fine surface layers makes them susceptible to changes in their physical characteristics when acted upon by heavy machinery (i.e., blading treatments). These changes include increases in bulk density and a reduction in surface water infiltration rates. The first component of this study is to quantify these changes and evaluate their effects on seedling growth.

The second component was aimed at answering the question, which of the treatments provide the most favourable soil micro-climate for seedling growth? To provide an answer, 15 of the 30 plots were intensively instrumented with soil moisture and soil temperature monitoring devices. The data were periodically collected between May and October, and are now being reduced and analyzed.

The pre-treatment data were collected in 1986, the treatments were done during July and August of 1987, and the first year post-treatment measurements were done immediately thereafter. The statistical analysis revealed a significant increase in bulk density due to the blading treatment, with the greatest increase occurring in the 0-7 cm layer. Also, soil infiltration rates were significantly reduced by the blading treatment, with the average post-treatment rates being equal to only 16% of the pre-treatment rates.

During the 1987 fall rains, ponding did occur in isolated pockets on the bladed treatments only. If extensive, long duration ponding is to occur as a result of blading, it is expected that it will result mostly from localized spring snowmelt.

The effects that these changes have on the growth rates of conifer seedlings have yet to be determined, as planting of Sitka spruce, amabilis fir and cedar will not occur until the spring of 1988. Monitoring the changes this year and in subsequent years will provide information on the speed of recovery of these sites following some rather drastic, but possibly necessary rehabilitation techniques.

A technical interim report describing the measurement techniques, the statistical analysis employed and the first year results will be available in the spring of 1988. A complete report describing all the results and their implications for floodplain forest management will be available after the completion of 2 years of post-treatment measurements.

Should there be any questions or comments about this project please contact:

Pierre Beaudry  
Forest Sciences Section  
BCFS, Smithers  
(604) 847-7429