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Environmental Impact of Flooding in the Main (Smallwood) Reservoir of the Churchill Falls Power Plant, Labrador, Canada. II. Chemical and Mechanical Analysis of Flooded Trees and Shoreline Changes.

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ABSTRACT

The Churchill Falls Hydro Project (called the "Upper Churchill Development") in Labrador, Canada, was initiated in the late 1960s. At that time, in general, not much attention was paid to the impact of such development on the flooding of vegetation especially forest stands. Both forested and un-forested terrestrial vege-tation types were flooded (244 915 ha). Some islands were created and in addition portions of existing areas were flooded to form islands (74 075 ha) in the Main (Smallwood) Reservoir area. This paper, the second in a series provides the rate of bio-chemical and physical deterioration of flooded trees in typical forest stands. The analysis of samples taken from selected trees indicated that their lignin content slightly increased and their elastic module decreased on the short term (three years after flooded). A model for the new shore line development was developed and illustrated with graphics and with an aerial photographic sterogramm in a typical flooded forest stand. Major changes were taking place within three years after the flooding. The most significant changes had occurred near the edge of the reservoir due to the continuous variation of water level caused by the amount of seasonal precipitation and by the required drawdown of water to operate the power plant. In general the water in the Main Reservoir reaches its maximum elevation in August, after this (from October to May) the water level slowly decreases during the ice cover. Ice forms first, when the water level is high, then the water level drops resulting in large vertical forces on the trees trapped in the ice. When the water in the reservoir is at its lowest point (at the spring) the ice cruses the trees, and when the water rises (in July) the ice up-roots the captured trees.

KEYWORDS

New Reservoirs, Flooding, Boreal, Shoreline Development, Wood Properties

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