

**Borton, Dennis Leland. *Effects of Primary Treated and Biologically Stabilized Kraft Mill Effluents on the Production, Biomass, and Growth Rates of Juvenile Salmonids in Three Stream Channels*. Dissertation. Oregon State University, 1974. (Reviewed by Aimee Furber)**

Borton examines the effects of primary and treated kraft mill effluent (KME) on cutthroat trout, coho salmon, chinook salmon, and brown trout. The streams studied were in the Willamette watershed. A primary producer of KME in the Willamette Valley at the time was the Western Kraft Corporation pulp and paper mill in Albany. The mill operated a non-bleaching kraft mill that produced about 500 tons of dry pulp per day from Douglas fir wood chips. In addition there is a neutral sulfite mill with a capacity of 200 tons per day. In-plant waste treatment included the recovery of digestion chemicals and turpenes, primary treatment in two sediment ponds for 24 hours. After the primary treatment the waste water was pumped to aeration ponds that contained diammonium phosphate.

Previously documented effects of KME on fish have been changes in tissue, blood, respiration, and circulation. During the experiment, primary or treated KME entered the streams at 0.75 mg per liter BOD. There was no effect on the production of salmonids when the primary KME entered the stream. However at brief periods the effluent was very toxic and twice fish were killed. There was no noticeable effect from treated KME. Previous studies have found the KME is more toxic in winter and spring months than in summer.

## **Critique**

The experiment was useful because it provided a look at how one paper mill was handling pollution problems. This is a much more detailed account than previous studies. It would be interesting to see how this mill's treatment of waste then compares with its waste treatment now.

I was surprised that the author had little interest in the health of the fish other than the impact on the fish population if some died. While the effluent from the mill was treated, I would still expect some impact on the fish directly or indirectly through impact on other aquatic biota. The study would be more useful if it addressed how well the pollution from the mill was being controlled or if recommendations to improve pollution control were made.

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