

Industrial Waste as an Environmental Resource



Disposal of industrial waste often causes environmental problems. But this site demonstrates how a determined town and a local mining company are turning industrial waste into an environmental resource benefiting the town and Lake Champlain.

Early wastes from Willsboro's lumber mills, gristmills, and iron forges, were dumped into the Boquet River. Later, a paper pulp mill piped its smoldering "black liquor" waste into lagoons dug into the river bank. By the time the mill closed, the cooled liquor or "black ash" covered 10 acres, and in places was 16 feet deep. Although not toxic, it could not support vegetation and river currents easily eroded the embankments.

Willsboro's latest "industry" is a wastewater treatment plant. Because of the expense, it could not be a tertiary plant

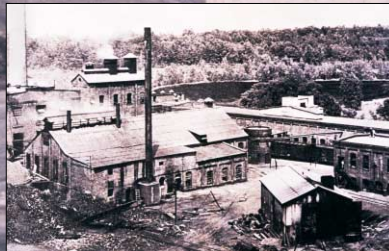
which would have reduced phosphorus in the effluent that is discharged into the river. The Boquet River empties into Lake Champlain, and the lake already suffers from too much phosphorus. Excessive phosphorus causes rampant growth of aquatic plants, harms lake species, and limits human use of the lake. Willsboro kept looking for a low-cost alternative, such as a constructed (artificial) wetland, to reduce phosphorus loading into the river and the lake. Although wetland plants use phosphorus for growth, the key to a constructed wetland's efficiency for phosphorus removal is the soil or the substrate material. The soil or substrate must adsorb and

store phosphorus over a long period of time. Cornell University engineering students tested the waste tailings from a Willsboro wollastonite mine and found that the tailings removed 90-99% of the phosphorus.

Before wetlands could be constructed, however, the eroding ash bank had to be stabilized for hydraulic safety. Therefore, large blast rock was keyed into the riverbed and brought up the face of the bank. A large trench was also dug at the upstream end and filled as a protective stone dike. Final touches included the planting of hundreds of trees. These plantings will begin to restore the river corridor while the wetlands will help create additional phosphorus treatment for Willsboro. The end result will be less phosphorus entering Lake Champlain.



The black ash deposits have no nutrients for plant growth, cannot hold water, and are extremely loose and friable (as seen from the footprints). (Courtesy of BRASS.)



In 1884, a paper pulp mill was constructed on the opposite (north) bank of the river, operating day and night for 81 years. (Courtesy of the Town of Willsboro.)



Bird's eye view of the paper pulp mill. (Courtesy of the Town of Willsboro.)