



Hudson River - Black River Regulating District

Wondering What That Early Morning or Evening Wave on GSL Might Be?

An Explanation from Robert S. Foltan, P.E., HRBRRD Chief Engineer:

"This is a phenomena for which I had no answer for more than 30 years. I spent summers at my grandfather's camp on South Shore Road just down from Overlook Beach Club and watched the same "wave" early in the morning when the Lake was smooth as glass. It was not until I had the opportunity to become familiar with the operation at Conklingville Dam as Chief Engineer that I finally realized the source.

Assuming it was not a passing boat.... I suspect the "wave" was caused by the change in the rate of release of water at the dam. The E.J. West hydro plant, owned by Erie Blvd Hydro, at Conklingville Dam makes a release for the Regulating District on a daily basis. Typically, during the summer months, the release is for a specific period of time, generally six to eight hours a day. During the remaining hours of the day no water is released. The hydro plant releases water at its most efficient flow capacity, about 4,000 cubic feet per second (cfs). Gates used to supply water to the hydroelectric turbine open rapidly, from a completely closed position to a full-open position in about 30 seconds. Conversely, when the plant stops generating electricity it closes the gates rapidly and the flow decreases to no flow in less than two minutes.

During opening of the gates, a large volume of water is withdrawn very rapidly from the narrow channel (at the spillway) which supplies water to the plant. The narrow channel at the bridge at Conklingville Dam limits how quickly water can enter the channel from the Lake. The volume of water withdrawn is so large that the elevation of the water in the channel drops by 12 to 18 inches in a matter of seconds. The Lake then "rushes" in rapidly - because water flows downhill. At that point, the elevation of the water in the channel rises causing the water elevation in the channel to return to, or even rise higher than, the elevation before the plant opened the turbine gates. This operation sets up the mechanics for the creation of a "wave."

When the plant closes the turbine gates, a mass of water (the Lake) continues to rush in to the channel because the water (the 4,000 cfs) has significant kinetic energy and momentum as it moves through the Lake and in to the narrow channel. Even though the hydro plant stops releasing water, the mass of water (4,000 cfs) which enters the channel has significant energy due to its motion, but now has nowhere to exit (because the plant stopped releasing water) and reflects (bounces) off of the channel walls and the closed gate structure at E.J. West. As the water in the Lake continues to rush into the channel (due to momentum) the water elevation rises a certain amount and then eventually returns to a normal, lower elevation equal to the Lake elevation. The rising and falling of the water elevation in the channel is again what sets up the "wave."

I recall regularly seeing the "wave", while standing on the beach at our camp, move from the dam-side of the Lake to the south towards Brooks Bay on days when the Lake was very calm. In fact, under the right conditions, a returning "wave" could also be visible after the water bounced off the shoreline to the south near Brooks Bay."