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July 15, 2021

Mr. Thomas J. Fargione
Regional Administrator
Federal Emergency Management Agency
26 Federal Plaza, Suite 1307
New York, NY 10278-0001

Re: Cayuga Island, Niagara Falls, NY. Reinstate the old map until errors are addressed.

Dear Administrator Fargione:

On May 5th of this year new flood insurance rate maps (FIRMs) were adopted for the City of Niagara Falls, NY. While the extent of the 1/100 flood plain was altered only slightly on Cayuga Island, the base flood elevation for Cayuga Island was increased by a foot or two. The net effect of this is that homeowners who had previously been relieved of the flood insurance mandate by means of an elevation measurement indicating that their homes had been above the base flood elevation were newly subjected to the flood insurance mandate.

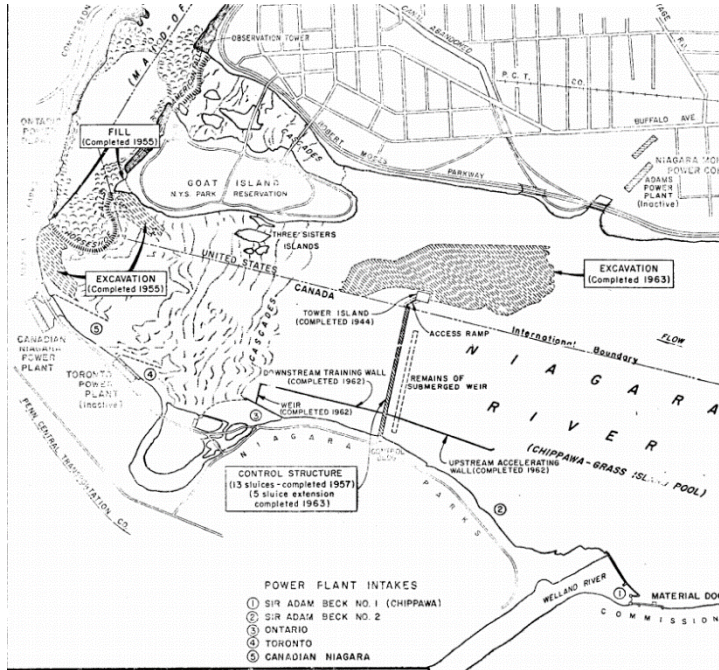
I write to advocate that FEMA re-institute the prior flood insurance rate map (2010) and re-study the flood risk for Cayuga Island, as the flood insurance mandate on Cayuga Island is based on flawed methodology and erroneous assumptions:

1) Basic algebra

The contours of the 1/100 flood plan remain more or less unchanged from the 2010 map to the new map. This logically should correspond to the base flood elevation (BFE) remaining more or less the same. An increase in BFE without a corresponding growth in the extent of the 1/100 flood plain (without some change in topography) as is the case here, defies basic algebra.

2) Mitigations unaccounted for

After flooding in 1955 and 1962, substantial construction was undertaken to mitigate the flood risk along Cayuga Island. These floods were caused by ice jams associated with the operation of the river's hydroelectric facilities, which had recently been expanded. The hydroelectric diversions above the cascades above the falls caused the water in this stretch of the river to be artificially low, such that ice which would normally be buoyed above rushing water over the cascades and the falls grounded out on the bedrock and formed ice jams, causing partial flooding on Cayuga Island. Multiple strategies were implemented to mitigate this risk:



a) Blasting and excavating a 45 acre area of bedrock above the falls to allow ice to pass more freely, which was completed in 1963 (see figure at left).¹

b) Annual installation through the winter months of a floating boom at the top of the Niagara River between Buffalo, NY and Fort Erie, ON to reduce ice in the river.

c) Constant winter icebreaking operations above the falls, with redundant US and Canadian ice breaking vessels standing by on location at all times.

d) Power plant winter operating procedures were modified several times over years to further reduce the likelihood of flooding. This “has had a significant effect in reducing flood stages” on Cayuga

Island.”² The most recent modification was in 1993, since which there has not been a flood on Cayuga Island

3) Inappropriate methodology

- No new hydrologic analysis was created for the new flood insurance rate map for Niagara Falls, NY. Basically, FEMA took the analysis from the study for the 2010 map³, and topped it up a couple feet based on recent wave height analysis.⁴
- The old map⁵ was actually based on a 1990 study which itself did not actually contain any hydrologic analysis either, but instead relied on yet-older analysis for Grand Island, NY from 1979⁶.
- The Grand Island study did not base its base flood elevation calculations on the capacity of the Niagara River to carry water away (its discharge)⁷. Rather, it used gauge readings along the Niagara River to inform a stage frequency analysis.
- Stage frequency analysis is supposed to estimate how often (frequency) a water body will reach a specific height (stage) over a given period of time as a result of the mathematical pattern of

¹ USACE Buffalo District, Reconnaissance Report to Update Section 205 Definite Project Report for Flood Control on Little River and Cayuga Creek at and in the Vicinity of Cayuga Island, Niagara County, NY, June 26, 1975, plate 2.

² Ibid. p. 4.

³ FEMA, *Flood Insurance Study, Niagara County, NY (All Jurisdictions)* May 4, 2021, Washington, D.C., p. 3.

⁴ Ibid., p. 5.

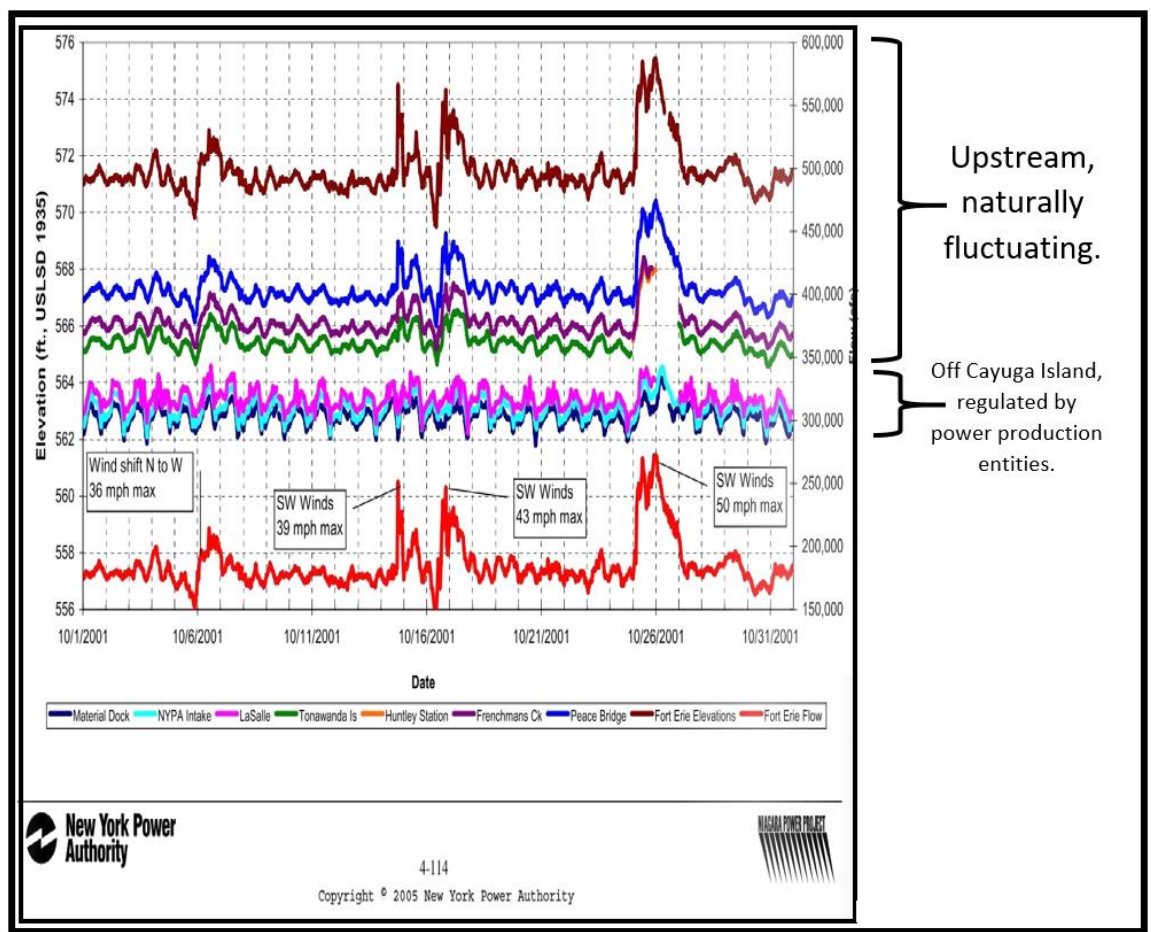
⁵ FEMA, *Flood Insurance Study, City of Niagara Falls, New York*, September 5, 1990, Washington, D.C., p. 7.

⁶ FEMA, *Flood Insurance Study, Town of Grand Island, New York*, July, 1979, Washington, D.C., p. 7.

⁷ FEMA, *Flood Insurance Study, City of Niagara Falls, New York*, September 5, 1990, Washington, D.C., p. 7.

how rivers rise and fall generally in a given climate as a result of natural forces. As such, stage frequency analysis is not an appropriate method where the height of the waterbody is “subject to substantial control by man” according to guidance from the U.S. Department of the Interior.⁸

- The stretch of the Niagara River off Cayuga Island is certainly “subject to substantial control by man,” in the sense intended by the Interior Department, as its “levels are primarily managed by operation of a gated control structure that partially spans the Niagara River above the Niagara Falls and Cascades.”⁹ Control stations operated by the New York Power Authority and Ontario Power Generation control the height of this stretch of river under orders issued by the International Niagara Board of Control (INBC). The operators maintain the level to within 1.5 feet of the target set by the INBC, but in extreme weather events they may allow a variance of up to 4 feet.¹⁰ Below please see a graph produced by NYPA consultants with additional annotation added at the right which shows how the regulated portion of the river off Cayuga Island shows an artificial and consistent pattern (with mild daily fluctuations based on power demand) compared to the unregulated stretches of river upstream.¹¹



⁸ Tate Darlymple, US Department of the Interior, Flood Frequency Analysis, 1960, Washington, D.C., p. 11.

⁹ Lee, Quinn and Clites, “Effect of Niagara River Chippewa Grass Island Pool on Water Levels of Lakes Erie, St. Clair and Michigan-Huron,” *J. Great Lakes Res.*, p. 963

¹⁰ NYPA, Niagara River Water Level and Flow Fluctuation Study, August, 2005, p. xxii.

¹¹ Ibid.

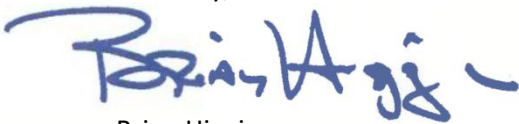
4) BFE inconsistent with historical patterns

If we are calculating base flood elevation using the stage frequency method rather than looking at the discharge capacity of the river, the historical record of floods is all we have on which to rely. The greatest flood ever recorded on Cayuga Island was reached an elevation of 567.1 feet above sea level in 1955¹². How then, is it possible, for FEMA to posit a BFE of 568 or 569 feet above sea level?

The imposition of the flood insurance mandate on Cayuga Island is unjustified. The level of the water lapping on the shores of this community is not dictated by unknowable forces of nature, but by technicians in power plant control rooms down the river working under the watchful eyes of a half dozen U.S., Canadian and international agencies. The re-imposition of this mandate on homeowners who have already paid a surveyor to file a letter of map amendment is particularly unacceptable.

Again, **I write to advocate that FEMA re-institute the prior FIRM (2010) and re-study the flood risk for Cayuga Island**, as the flood insurance mandate on Cayuga Island is based on flawed methodology and erroneous assumptions.

Sincerely,

A handwritten signature in blue ink that reads "Brian Higgins". The signature is stylized and includes a horizontal line extending to the right.

Brian Higgins
Member of Congress

¹² Ibid. p. 2.