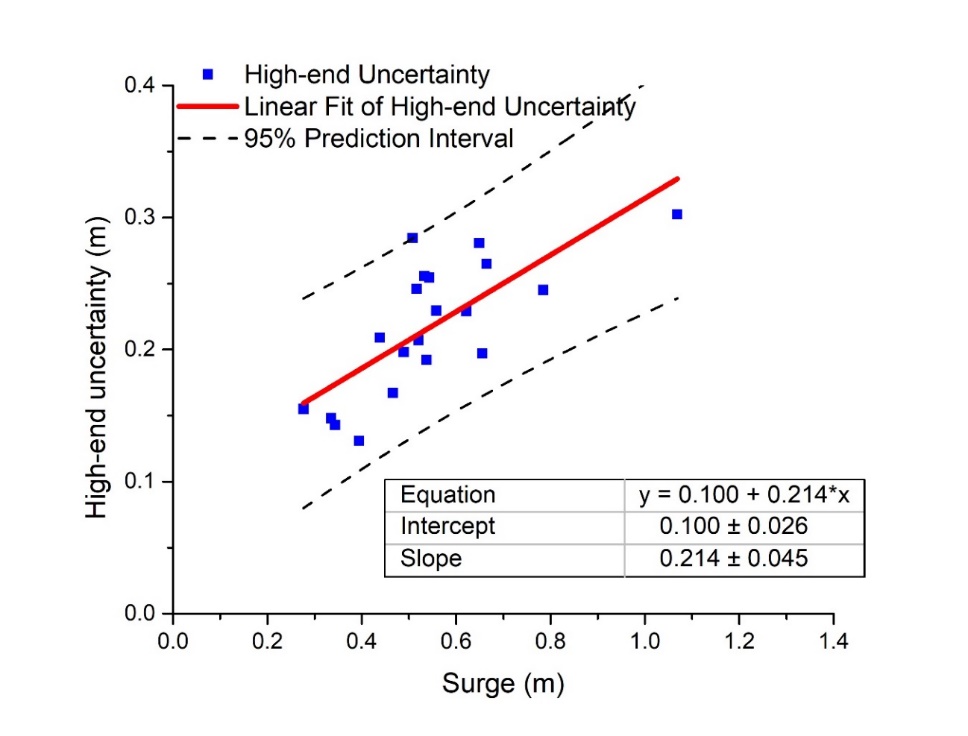
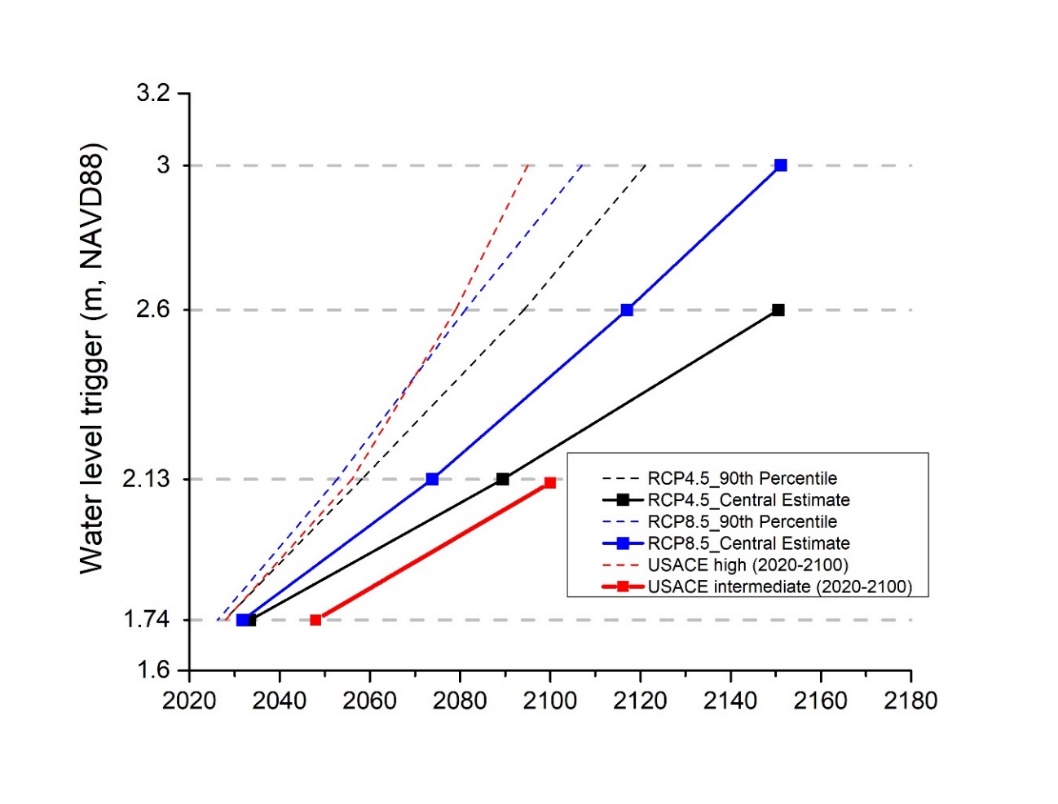
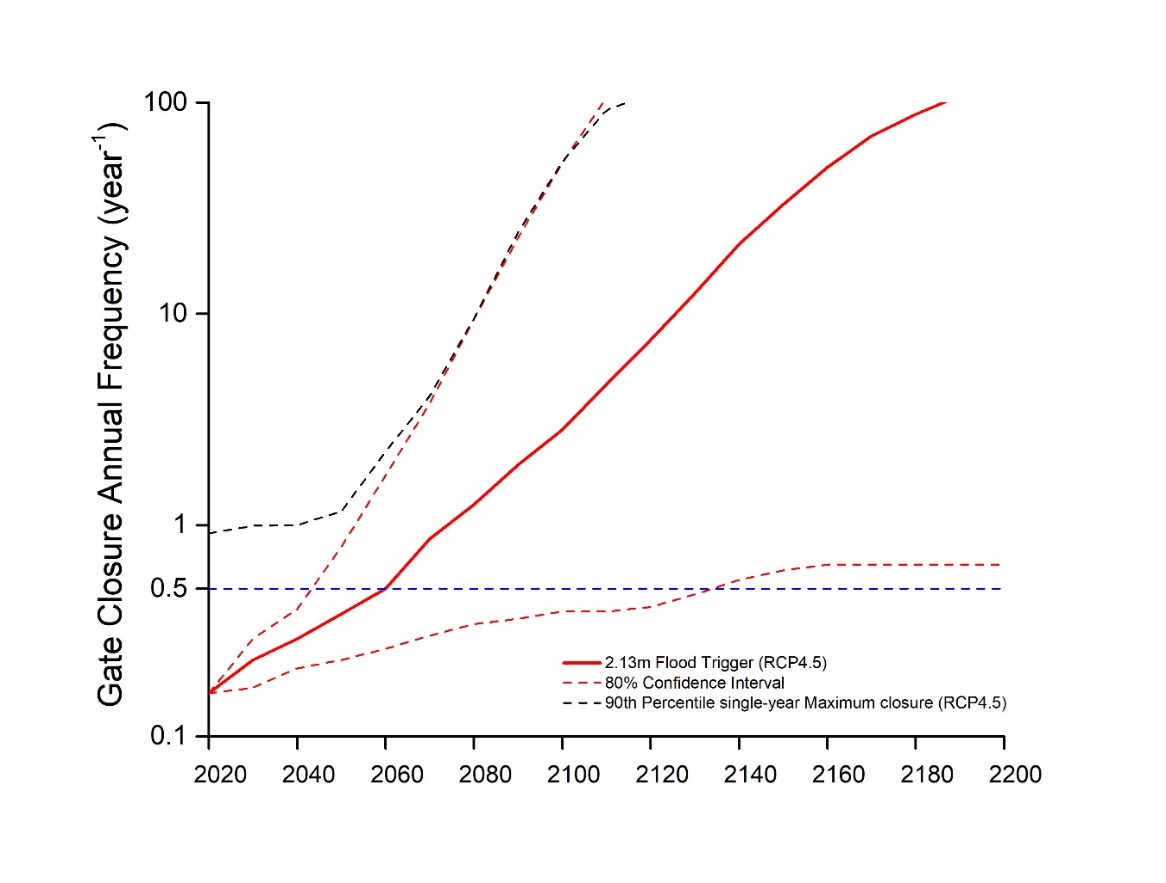
Supplementary Materials:



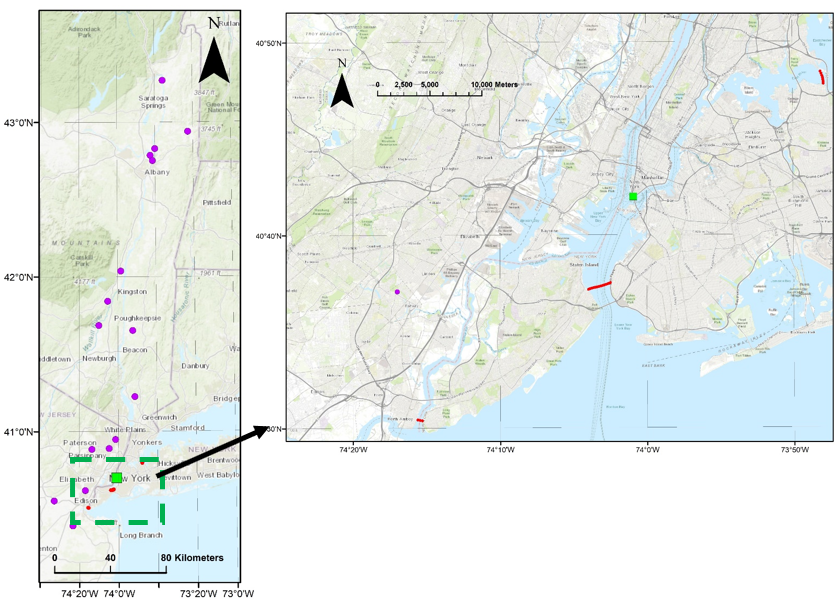
**Figure S1.** Scatterplot is the top 20 high-water level events showing the storm surge and its corresponding “high-end uncertainty” 24 hours before the event (from an ensemble forecast) in the past 4 years. The red line is the “forecast uncertainty” regression model with the 95% prediction interval (black dash line).



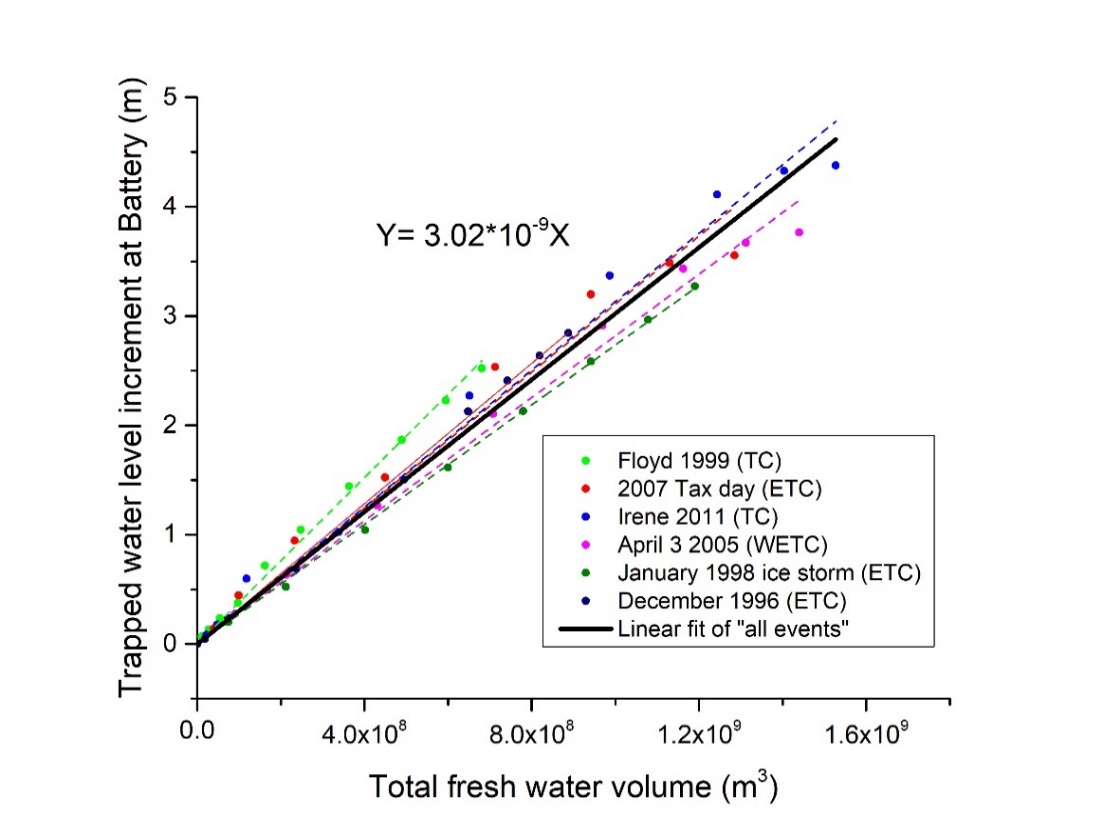
**Figure S2.** Water level trigger future evolution by allowing constant AEP (0.5 year-1) based on RCP 4.5 (black) and RCP 8.5 (blue) future greenhouse gas emissions trajectories and the USACE intermediate SLR projection (red); these results are using observed data only (no forecast uncertainty has been incorporated), in contrast to Figure 7.



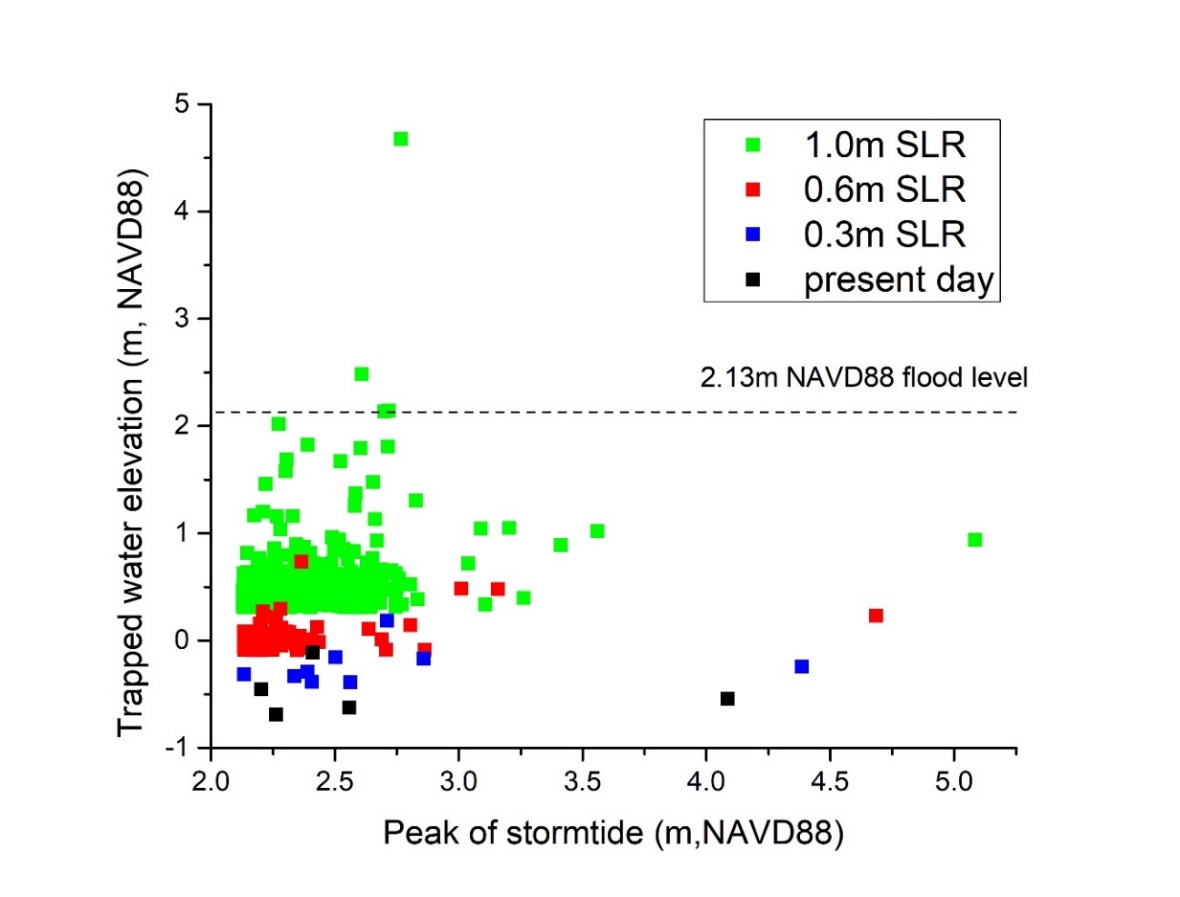
**Figure S3.** Gate closure frequency analysis results based on constant 2.13 m flood trigger and RCP 4.5 future greenhouse gas emissions trajectory; Black dashed line is the 90th percentile single-year closure frequency. Dashed line is as Figure 4.



**Figure S4.** The study area with the USGS gauge locations (Purple dots), the three barriers’ closure system (red dots) and the Battery tide gauge location (Green square).



**Figure S5.** The relationship between water elevation rise at Battery and total accumulated water volume. Different colors are corresponding to different historical flood events with multiple points for different time of the event; the points recorded the modeled water rise at Battery and the corresponding total freshwater input; the dash lines are the linear fit of each flood event; the black solid line is the final relationship fitted by using all the points .



**Figure S6.** Trapped river flooding analysis results based on constant 2.13 m flood trigger assuming gates close/open at low tide, in contrast to Figure 9.