

As the co-chair of the Suburban Climate Action Planning committee of Climate Reality Chicago, I offer the following information to address the statement referencing the 2019 floodplain maps and climate change impacts in the October 28th Manager's Memo, item #1.

The reason why the floodplain maps do not show any changes is because the 2019 Flood Insurance Study (FIS) reuses the 1992 hydrologic and hydraulic (H&H) modeling results, as shown in the clips below from the FIS. The FIS is publicly available at FEMA.gov.

City of Naperville:

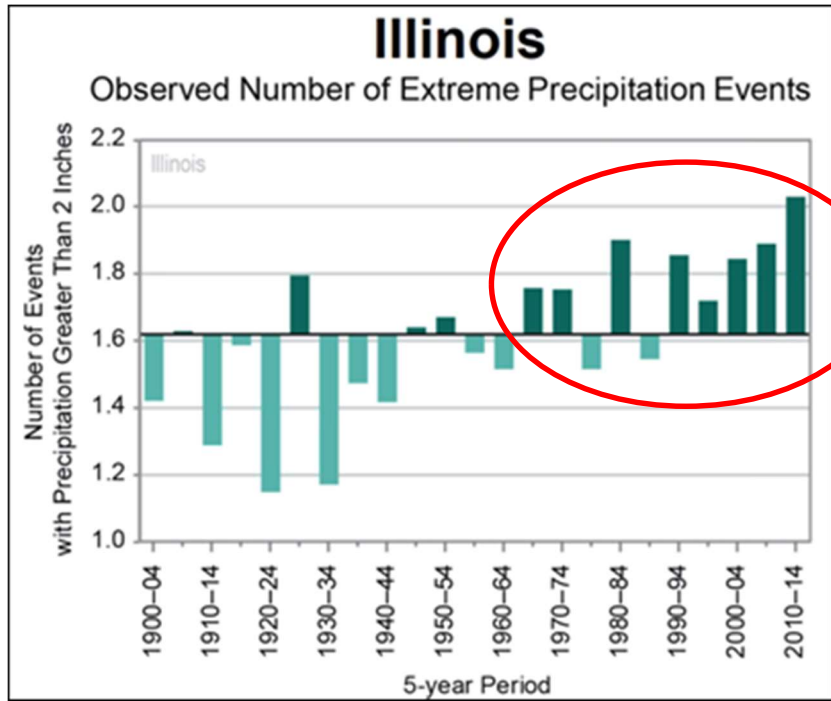
The hydrologic and hydraulic analyses for the FIS report dated May 18, 1992 (Reference 13) were prepared by the Chicago District of the USACE for the FIA under Inter-Agency Agreement Nos. IAA-H-16-75, Project Order No. 21 and IAA-H-7-76, Project Order No. 1.

West Branch DuPage River (WBWB)

Discharge-frequency data for the West Branch DuPage River were developed through the use of the Chicago Metropolitan - DuPage River Basin study performed by the USACE's Hydrologic Engineering Center (Reference 36). In the Chicago study, the DuPage River Basin above Shorewood, Illinois, was

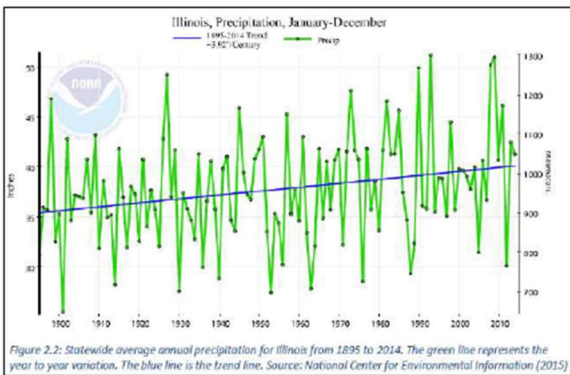
divided into 20 subareas and a generalized HEC-1 rainfall-runoff computer model was calibrated for the basin (Reference 34). Using 24-hour rainfall data obtained from Weather Bureau Technical Paper No. 40, one-hour values, in critical order, were entered into the HEC-1 model of the DuPage River Basin to determine the 10-, 2-, and 1-percent-annual-chance peak discharges (Reference 39). The USGS stream gages used for the hydrologic analyses are presented below.

The precipitation data from Technical Paper No. 40 (TP-40) dates back to 1960. The land surface data is nearly 30 years old. Impervious surfaces associated with land development has increased substantially in the past 30 years; impervious surfaces do not absorb stormwater and create higher flows in creeks and the West Branch DuPage River. Higher flows erode the river channel and overbank which is why the City and Park District have recently completed streambank stabilization projects. Since 1992, the region has experienced many heavy rainfall events, such as the 1996, 2008, 2013, and 2017 events. This data is not represented in the modeling or mapping. The following graphics are from Illinois State Water Survey (ISWS) depicting the precipitation data.



Circled data is not included the modeling or mapping.

Changes to intensity-frequency-duration of precipitation



Comparison of Bulletin 70 and 75 (NE Section)						
	2-year	5-year	10-year	25-year	50-year	100-year
Bulletin 70	3.04	3.80	4.47	5.51	6.46	7.58
Bulletin 75	3.34	4.30	5.15	6.45	7.50	8.57
Percentage Increase	10%	13%	15%	17%	16%	13%

Precipitation frequencies have changed over time. In northeastern Illinois, the trend is that all precipitation frequencies are increasing.

Source: Illinois State Water Survey

ISWS updated Bulletin 70 precipitation design values in 2019 because the historic rainfall record has changed dramatically. The design values result from statistical analysis of the historic record. Climate change is forecast to continue these trends of increased frequency and intensity, not prolonged rainfall (duration) events. With a 2°C warming projected, the atmosphere can hold 14% more moisture. Temperature records show that we have already warmed more than a degree. The historic precipitation data has already exceeded the results of ISWS’s climate change study for the larger design frequencies, showing that climate change is already happening. Similar results have occurred across the country.

“Communicating the Impacts of Potential Future Climate Change on the Expected Frequency of Extreme Rainfall Events in Cook County, IL” (2016)

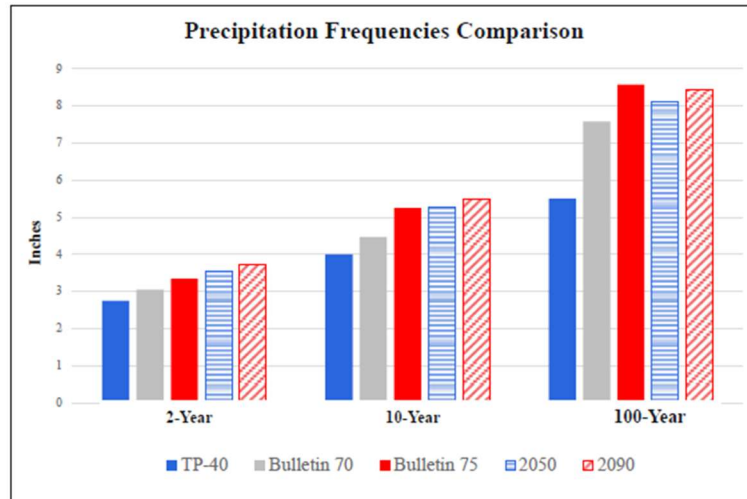
<http://www.isws.illinois.edu/pubs/pubdetail.asp?CallNumber=ISWS+CR+2016-05>

TP-40 (1960)

Bulletin 70 (1989)

Bulletin 75 (2019)

Sources: NOAA, ISWS



It is especially problematic that the H&H study uses precipitation data that is 60 years old! The 100-year, 24-hour design storm has increased from 5.5 inches (TP-40) to 8.57 inches (Bulletin 75). Naperville is severely overdue for an update to the H&H and remapping of their floodplains. Be advised that the floodplain boundaries may change significantly, given the new precipitation and land surface data.

Floodplain and stormwater management will continue to be more difficult to manage in the future. The Illinois Department of Natural Resources (IDNR) released the “Report for the Urban Flooding Awareness Act” in 2015 which states that more than “90% of the urban flooding damage claims from 2007 to 2014 were outside the mapped floodplain.” It goes on to say that “urban flooding is expected to increase unless action is taken. The storm sewer infrastructure is the underpinning of urban drainage, and action is needed to update aging, undersized systems.”

With the update to Bulletin 75, existing stormwater basins and sewers are now considered undersized for our current rainfall amounts. The American Society of Civil Engineer’s (ASCE) Changing Climate committee is discussing how to design infrastructure to ensure our pipes meet the performance during the design life as the weather conditions change. Costs of infrastructure are based upon meeting the design life, usually 25 to 50 years. If storm sewers no longer function as intended 10 years after construction and retrofits have to be made, additional tax dollars are spent on a project when it could have been designed and constructed to operate for the entire design life. Designing for future conditions is the concept behind the federal government’s “Build Back Better” climate-resilient infrastructure plan. Mitigation studies have shown that for every dollar spent building to a higher standard, approximately \$10 is saved on rebuilding infrastructure that did not meet its intended purposed during the design life.

The recently published “An Assessment of the Impacts of Climate Change in Illinois” concludes that climate change will have a significant impact on all aspects of life, especially public health. Among the long list of authors on this report are the State Climatologist, Dr. James Angel, and a leading climate scientist, Dr. Donald Wuebbles. Dr. Wuebbles also authored the National Climate Assessment.

Metropolitan Mayors Caucus’ Climate Action Plan states that the Chicago region is at high risk for extreme heat and increased precipitation and subsequent flooding due to climate change. The National

Oceanic and Atmospheric Administration (NOAA) was one of the lead authors on the plan. Does the City of Naperville staff disagree with NOAA and the nation's leading climate scientists?

In conclusion, it appears that the City does not have the expertise internally to comprehend and make sound decisions on these scientific issues. Has the City considered hiring a Certified Floodplain Manager (CFM) and a Certified Climate Change Professional (CC-P)? Climate Reality is available to provide education on climate change, implementing a climate action plan, reducing emissions, and addressing the impacts of climate change on infrastructure and public health.