

The Evolving Impacts of Urban Flooding in the Nation and New Jersey

NJ Green Infrastructure & Stormwater Utilities Symposium
John A. Miller, P.E., CFM, CSM
June 19, 2019



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University of Maryland and Texas A&M University



Dr. Gerald Galloway, et al.
U of MD

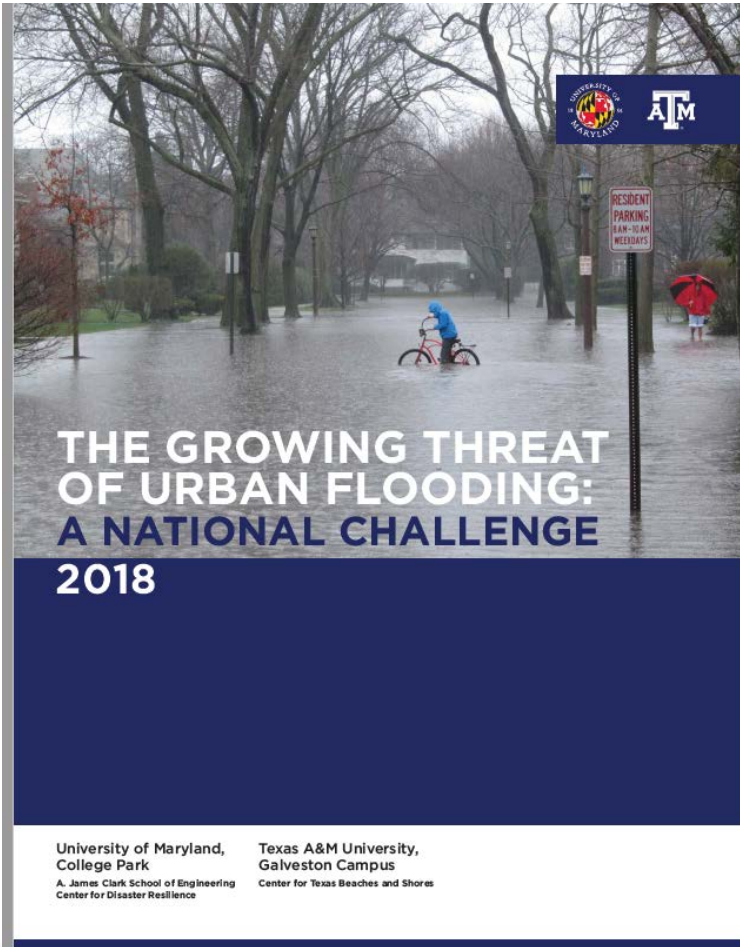
Dr. Sam Brody, et al.
Texas A&M

November 2018



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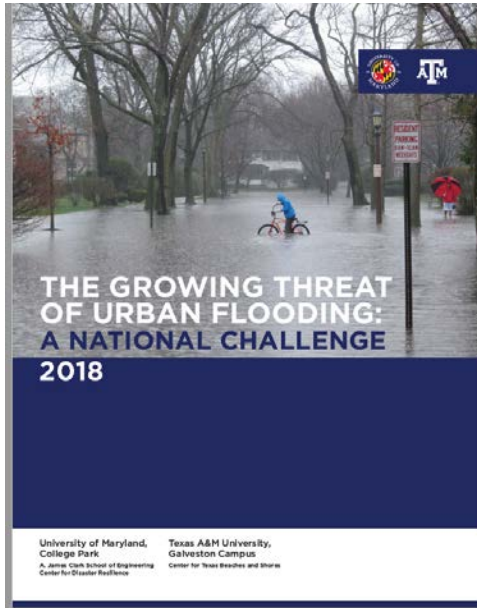


“While the major storms of 2017 and 2018 (Florence, Harvey, Maria, and Irma) will be remembered as hurricanes, in many cases it was the intense rainfall that brought urban areas to a standstill, overwhelming homes and transportation arteries with flood water.”



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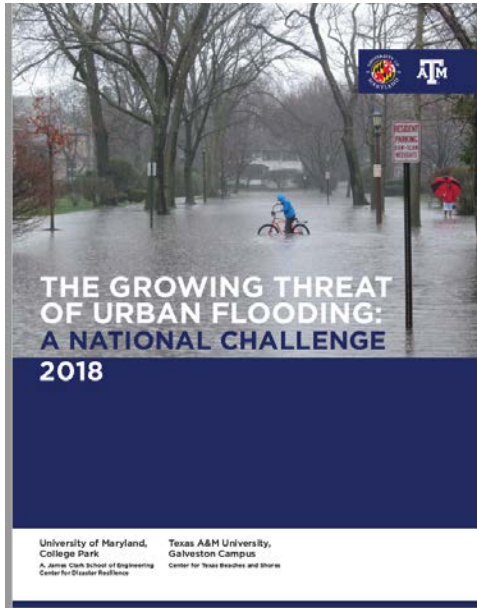
Findings:

- “In much of the United States, urban flooding is occurring and is a growing source of significant economic loss, social disruption, and housing inequality.”
- “The growing number of extreme rainfall events that produce intense precipitation are resulting in—and will continue to result in—increased urban flooding unless steps are taken to mitigate their impacts.”



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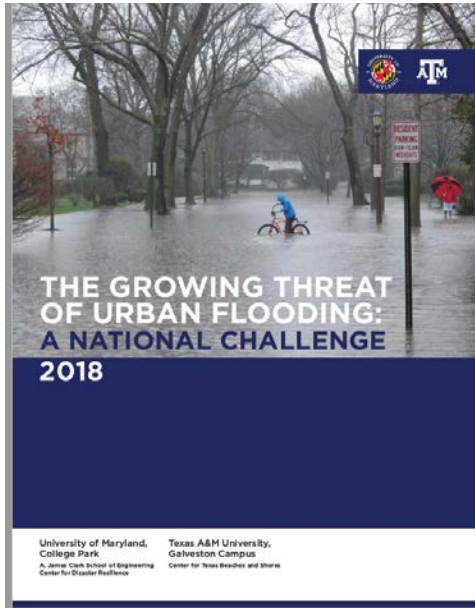


- “...the division of responsibilities among federal, state, regional, local, and tribal governments for urban flood and stormwater management are not clearly defined.”
- “Many of the urban wastewater and stormwater systems that provide the backbone of urban flood mitigation are in poor condition and—in some locations—are inadequate and in need of strong support.”



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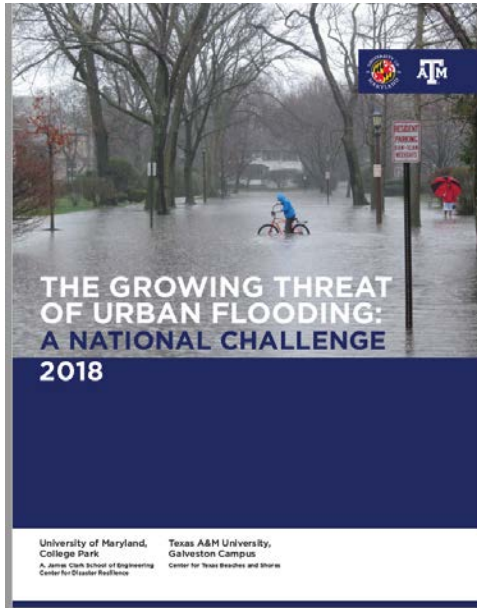


- “The economic and social impacts of urban flooding are generally not well known and understood by many public officials and the unaffected public.”
- “Governments, at all levels, have not provided effective means to communicate risks to those in urban flood-prone areas.”



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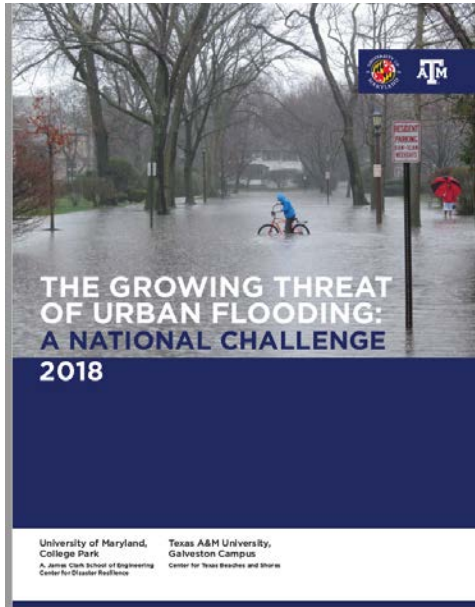


- “Many homeowners and renters...do not understand that they can take steps to significantly reduce their property’s vulnerability, and many lack the resources and support necessary to carry out such actions.”
- Data—covering insurance claims, assistance, and loans for flood mitigation—are not easily available or shared with local decision makers, researchers, and the residents themselves



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Selected recommendation from report:

“The Congress and the administration, in coordination with state governors, regional, local, and tribal officials, should develop appropriate mechanisms at the federal, state, and local level to fund necessary repairs, operations, and upgrades of current stormwater and urban flood-related infrastructure.”

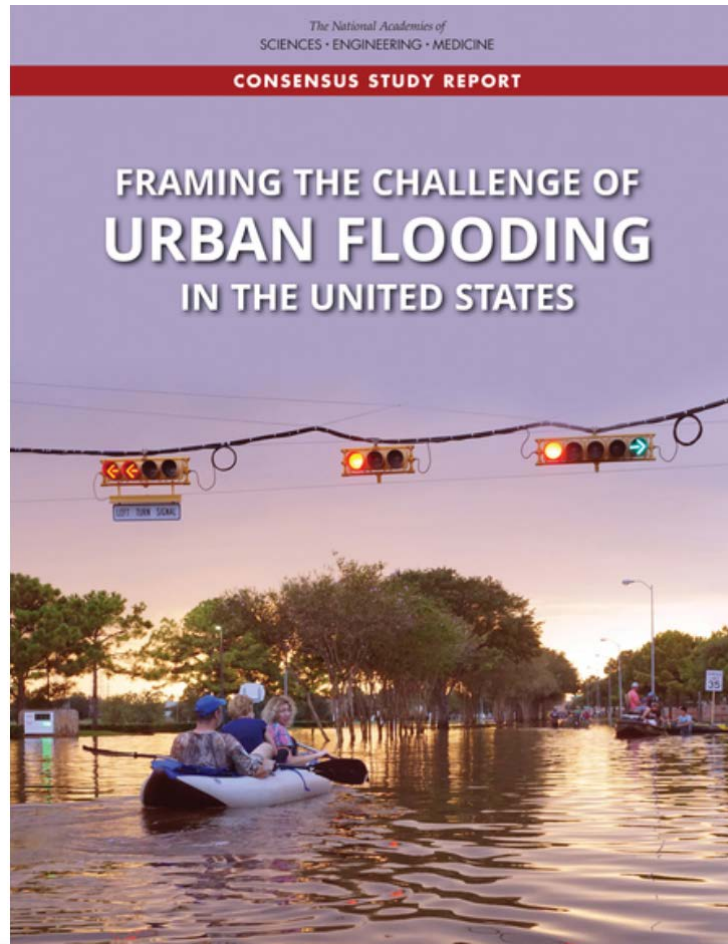


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The National Academies Press

Supported by a contract between the National Academy of Sciences and the Federal Emergency Management Agency

March 2019

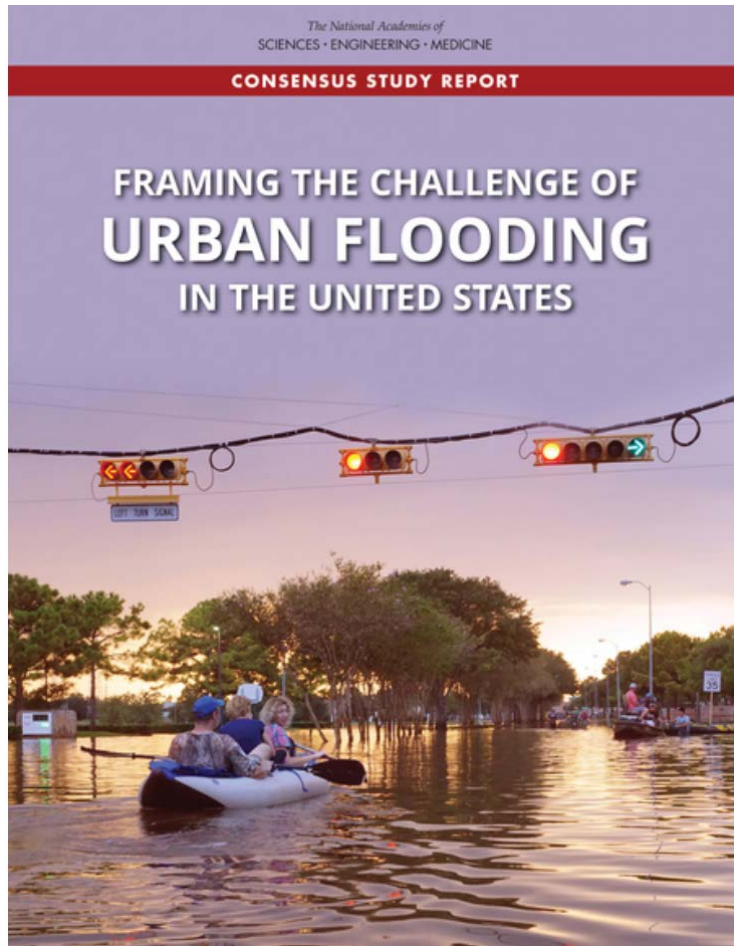


Committee on Urban Flooding in the United States; Program on Risk, Resilience, and Extreme Events; Policy and Global Affairs; Water Science and Technology Board; Division on Earth and Life Studies; National Academies of Sciences, Engineering, and Medicine



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The National Academies Press



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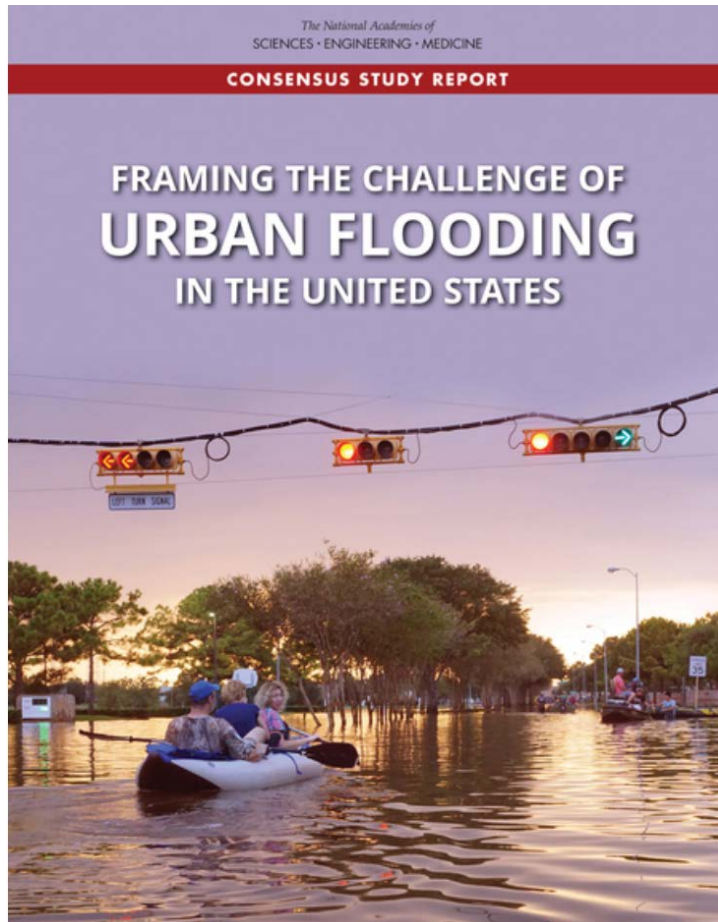
Study Staff

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Urban Flooding

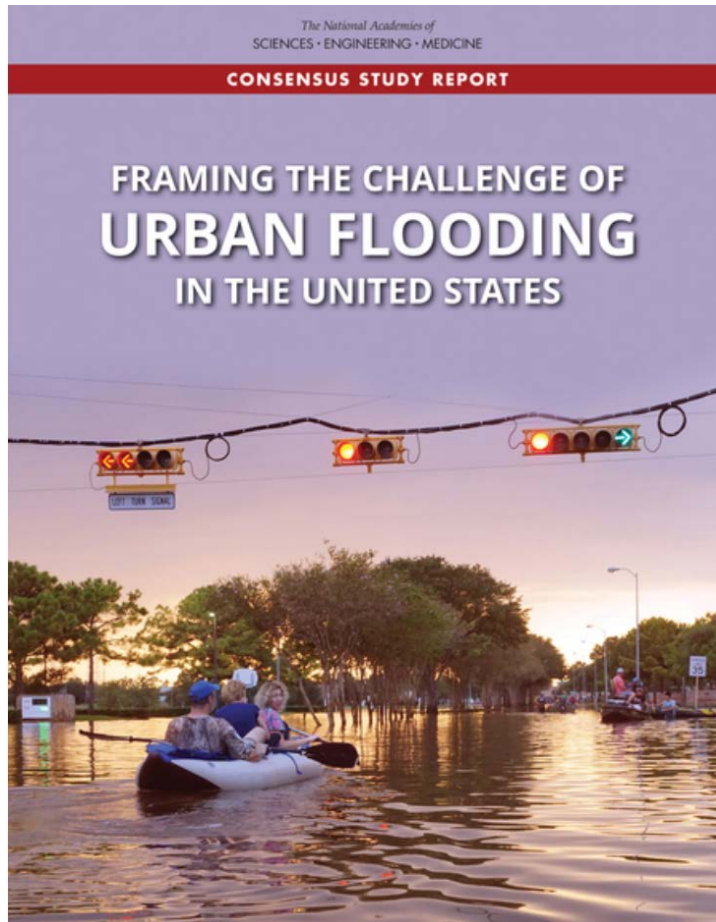


“Urban flooding is caused when the inflow of storm water in urban areas exceeds the capacity of drainage systems to infiltrate storm water into the soil or to carry it away.”



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Urban Flooding

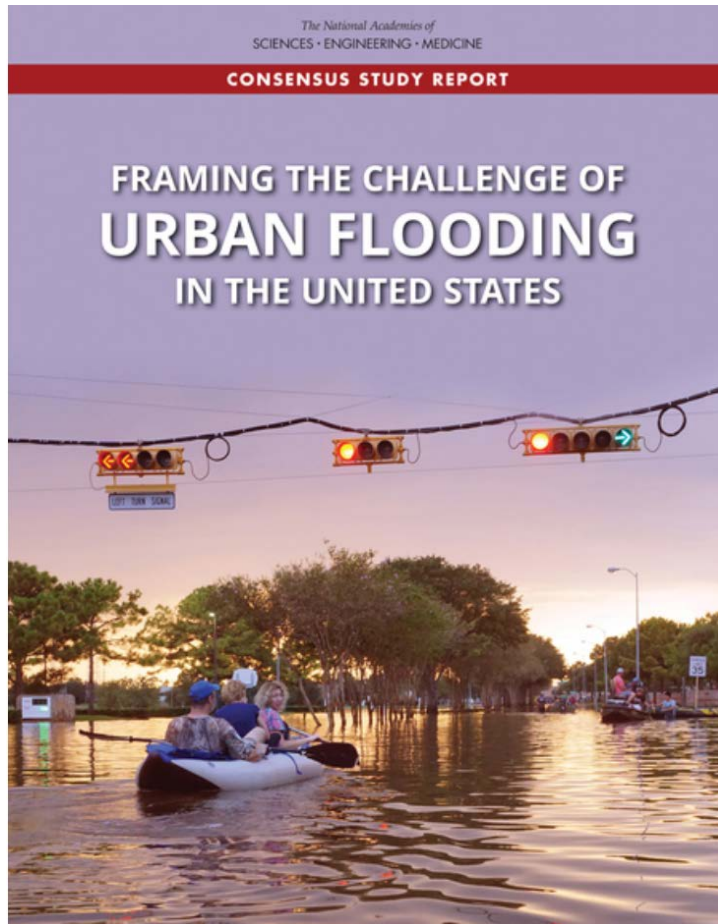


“In older cities, sewer systems carrying both storm water and wastewater can become surcharged during storms, causing sewer backups in homes—an often chronic and unseen form of urban flooding.”



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Urban Flooding

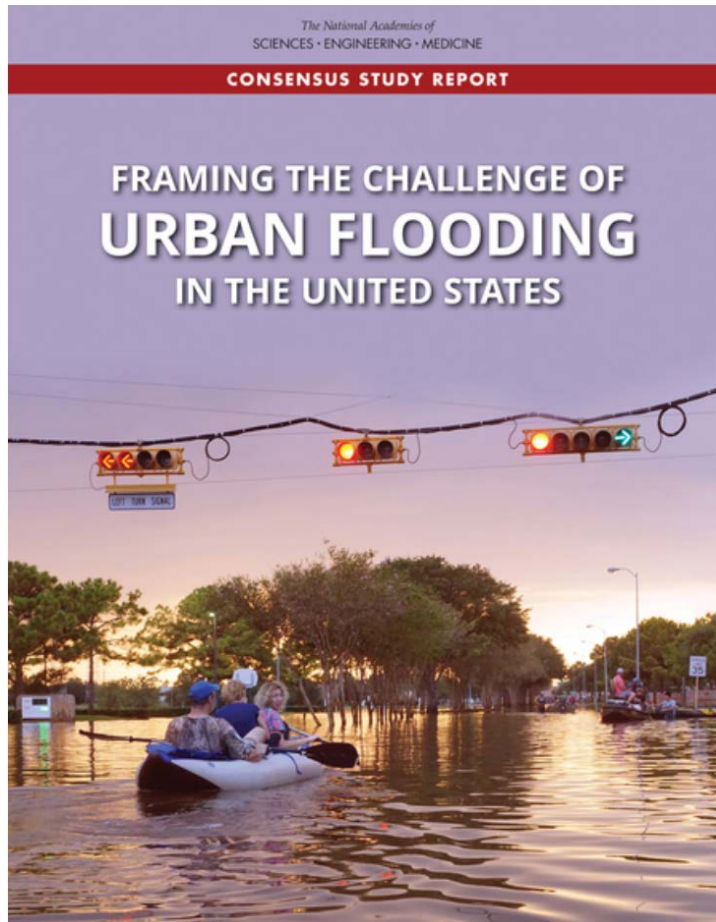


“Decisions on land development and design or maintenance of infrastructure were seen to amplify the intensity and influence the location of flood impacts in each metropolitan area.”



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Urban Flooding

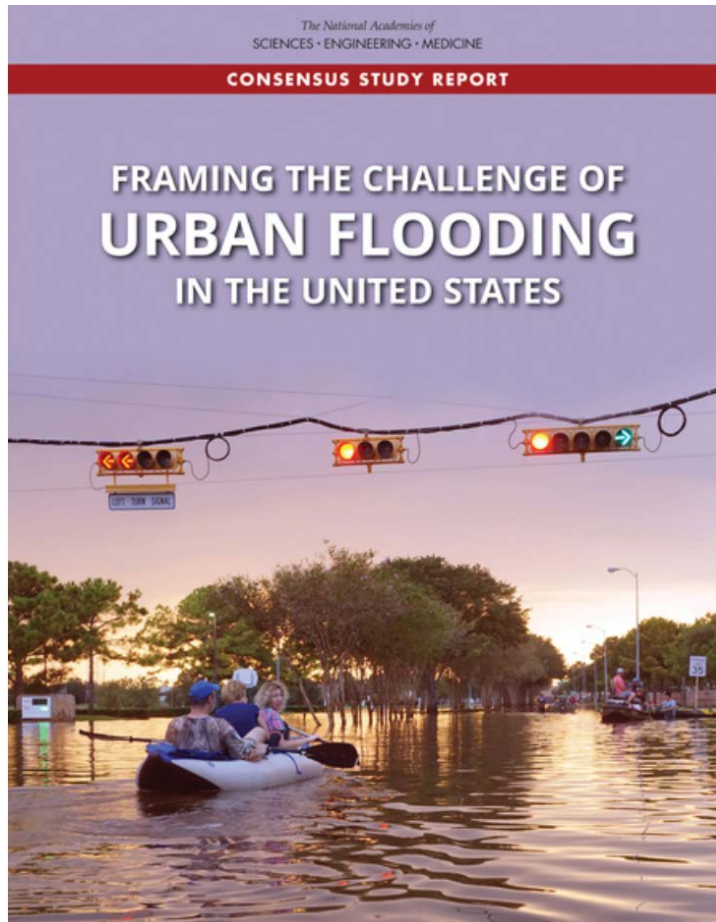


“...the poor, racial and ethnic minorities, the elderly, renters, non-native English speakers, and those with mobility challenges were disproportionately affected....”



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Urban Flooding

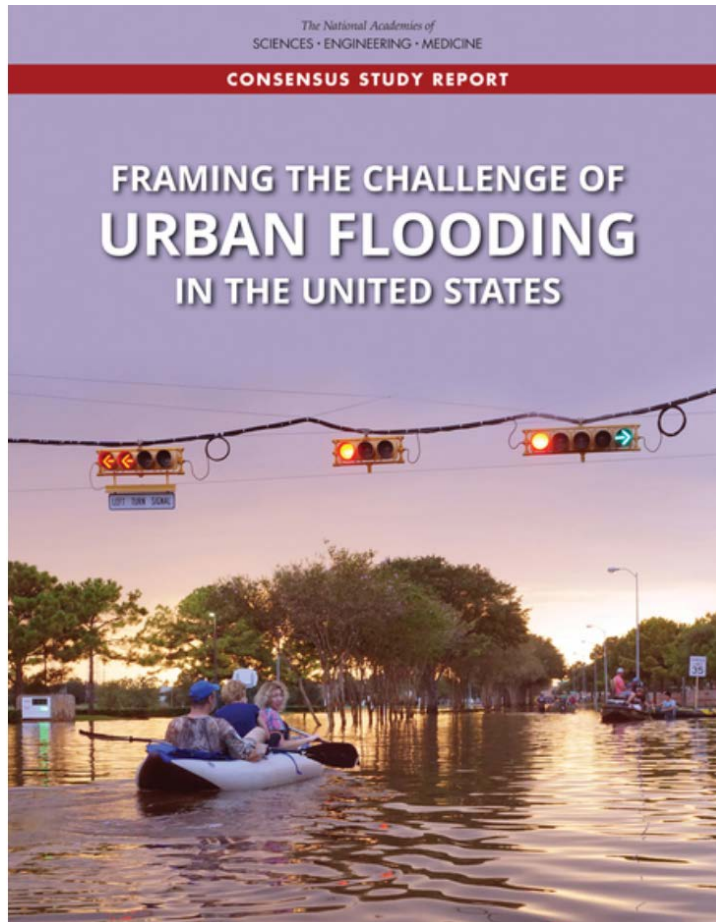


“The range of collaborative projects [, to address urban flooding, included] large-scale blue-green solutions....”



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Urban Flooding

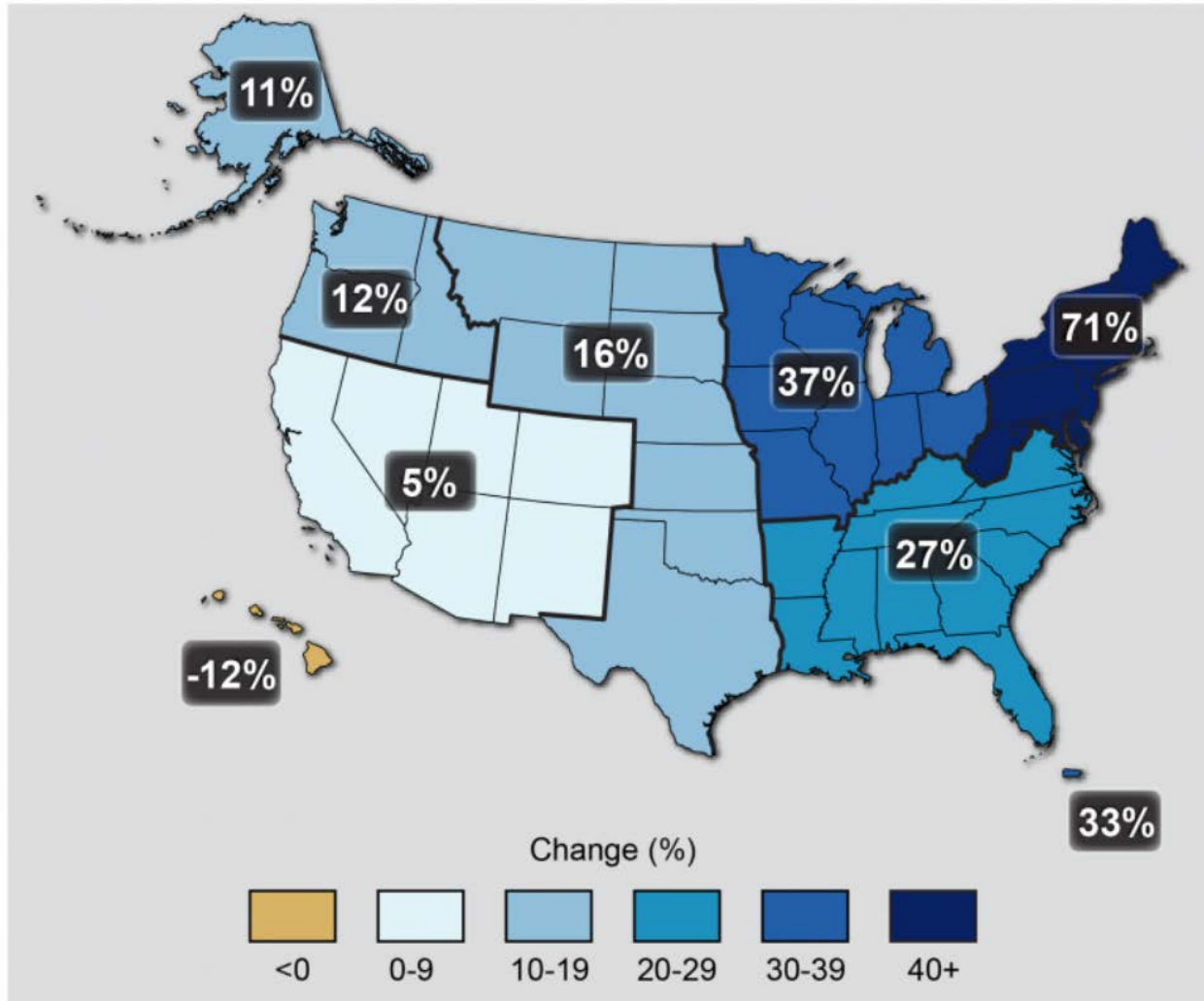


“..flood problems are likely to get worse with continued urban development and population growth in urban areas, as well as with climate change, which is increasing sea-level rise and the frequency of heavy precipitation events.”



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Observed Change in Very Heavy Precipitation



NOTES
The map shows percent increases regionally in the amount of precipitation falling in very heavy events (defined as the top 1% of all daily events), from 1958 to 2012.

SOURCE
National Climate Assessment (U.S. Global Change Research Program, 2014)

Margate, Atlantic Co. (July 2017)



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Elmwood Park, Bergen Co. (October 2017)



FEMA

Montclair, Essex Co. (April 2018)



nj.com



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Brick, Ocean Co. (August 2018)



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Storm Events Database

Data Access

- [Search](#)
- [Bulk Data Download \(CSV\)](#)
- [Storm Data Publication](#)

Documentation

- [Database Details](#)
- [Version History](#)
- [Storm Data FAQ](#)
- [NOAA's NWS Documentation](#)
- [Tornado EF Scale](#)

External Resources

- [NOAA's SPC Reports](#)
- [NOAA's SPC WCM Page](#)
- [NOAA's NWS Damage Assessment Toolkit](#)
- [NOAA's Tsunami Database](#)
- [ESRI/FEMA Civil Air Patrol Images](#)
- [SHELDUS](#)
- [USDA Cause of Loss Data](#)

Storm Events Database

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Event Details:

Event	Flash Flood
-- Flood Cause	Heavy Rain
State	NEW JERSEY
County/Area	PASSAIC
WFO	OKX
Report Source	Broadcast Media
NCEI Data Source	CSV
Begin Date	2018-08-11 18:00 EST-5
Begin Location	1NW GREAT NOTCH
End Date	2018-08-11 18:30 EST-5
End Location	1SSE TOTOWA
Deaths Direct/Indirect	0/0 (fatality details below, when available...)
Injuries Direct/Indirect	0/0
Property Damage	3.20M
Crop Damage	0.00K
Episode Narrative	A stalled stationary boundary within a very moist airmass provided a focusing mechanism for several rounds of heavy rain that resulted in widespread flash flooding across northeast New Jersey. The Caldwell, NJ ASOS recorded 4.92 inches of rain, and multiple other stations across northeast New Jersey received between 2.5 inches and 4 inches of precipitation. The Little Falls area of Passaic County was particularly hard hit when rising water from the Peckman River swept away numerous cars from the Route 46 Chrysler, Jeep, Dodge dealership.
Event Narrative	Flooding from the Peckman River impacted the Party City and Best Buy shopping centers as well as the Planet Fitness gym in Woodland Park. Cars were underwater in the Best Buy parking lot. Overall, approximately 210 homes, 70 businesses, and 22 parked cars were impacted by flooding in Woodland Park.



All events for this episode:

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	3.200M	0.00K
FANWOOD	UNION CO.	NJ	08/11/2018	06:40	EST-5	Flash Flood		0	0	0.00K	0.00K
SCOTCH PLAINS	UNION CO.	NJ	08/11/2018	06:40	EST-5	Flash Flood		0	0	0.00K	0.00K
EAST NEWARK	HUDSON CO.	NJ	08/11/2018	07:31	EST-5	Flash Flood		0	0	0.00K	0.00K
FAIRVIEW	BERGEN CO.	NJ	08/11/2018	07:50	EST-5	Flash Flood		0	0	0.00K	0.00K
JERSEY CITY ARPT	HUDSON CO.	NJ	08/11/2018	07:51	EST-5	Flash Flood		0	0	0.00K	0.00K
HOBOKEN	HUDSON CO.	NJ	08/11/2018	08:00	EST-5	Flash Flood		0	0	0.00K	0.00K
MONTCLAIR	ESSEX CO.	NJ	08/11/2018	15:50	EST-5	Flash Flood		0	0	0.00K	0.00K
PACKANACK LAKE	PASSAIC CO.	NJ	08/11/2018	15:55	EST-5	Flash Flood		0	0	0.00K	0.00K
CALDWELL	ESSEX CO.	NJ	08/11/2018	16:00	EST-5	Flash Flood		0	0	0.00K	0.00K
SOUTH PATERSON	PASSAIC CO.	NJ	08/11/2018	16:40	EST-5	Flash Flood		0	0	0.00K	0.00K
CLIFTON	PASSAIC CO.	NJ	08/11/2018	16:44	EST-5	Flash Flood		0	0	0.00K	0.00K
ALLWOOD	PASSAIC CO.	NJ	08/11/2018	16:55	EST-5	Flash Flood		0	0	0.00K	0.00K
CLIFTON	PASSAIC CO.	NJ	08/11/2018	17:00	EST-5	Flash Flood		0	0	0.00K	0.00K
CARLSTADT	BERGEN CO.	NJ	08/11/2018	17:07	EST-5	Flash Flood		0	0	0.00K	0.00K
GLEN RIDGE	ESSEX CO.	NJ	08/11/2018	17:30	EST-5	Flash Flood		0	0	0.00K	0.00K
BELWOOD PARK	ESSEX CO.	NJ	08/11/2018	17:40	EST-5	Flash Flood		0	0	0.00K	0.00K
TOTOWA	PASSAIC CO.	NJ	08/11/2018	17:42	EST-5	Flash Flood		0	0	0.00K	0.00K
ROCHELLE PARK	BERGEN CO.	NJ	08/11/2018	17:45	EST-5	Flash Flood		0	0	0.00K	0.00K
TOTOWA	PASSAIC CO.	NJ	08/11/2018	17:48	EST-5	Flash Flood		0	0	0.00K	0.00K
GLEN RIDGE	ESSEX CO.	NJ	08/11/2018	18:00	EST-5	Flash Flood		0	0	0.00K	0.00K
GREAT NOTCH	PASSAIC CO.	NJ	08/11/2018	18:00	EST-5	Flash Flood		0	0	3.200M	0.00K
LITTLE FALLS	PASSAIC CO.	NJ	08/11/2018	18:00	EST-5	Flash Flood		0	0	0.00K	0.00K
Totals:								0	0	3.200M	0.00K



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Nutley, Essex Co. (August 2018)



youtube.com



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Bogota, Bergen Co. (August 2018)



Bogota Officer Michael Laferrera helps a bridge out of a flooded vehicle Aug. 11, 2018.

(Photo: Courtesy of Bogota Police Department)



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June 18, 2019 - Flash Flood Watch

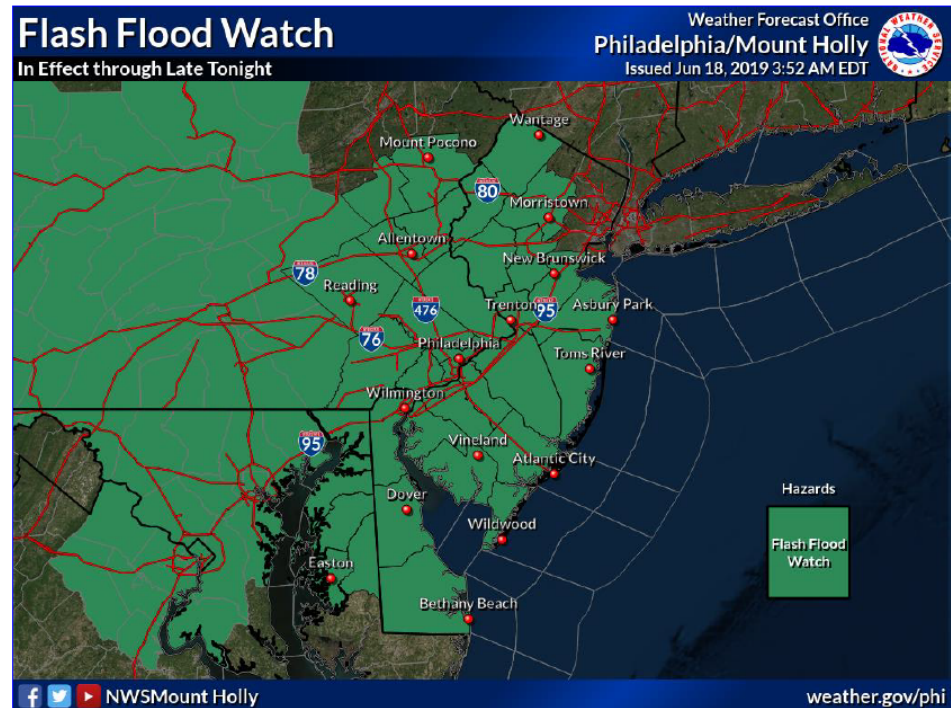
Weather Watches & Warnings

New York: No watches/warnings in effect

New Jersey: **Flash Flood Watch** in effect for central / southern NJ from noon today through this evening.

- The strongest storms will be capable of producing torrential downpours.
- **Flash Flooding** will be a concern especially this afternoon and evening. Most of the State of NJ is now under a **Flash Flood Watch**.
- The highest threat will exist where storms regenerate in the same area, especially over more vulnerable urban centers where **Flash Flooding** can occur faster.

Puerto Rico / USVI: No watches/warnings in effect



Source: [Watches and Warning](#)



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