# Cambridge Climate Resiliency Tabletop Exercise

## Flood Risk under a Uncertain Future Climate

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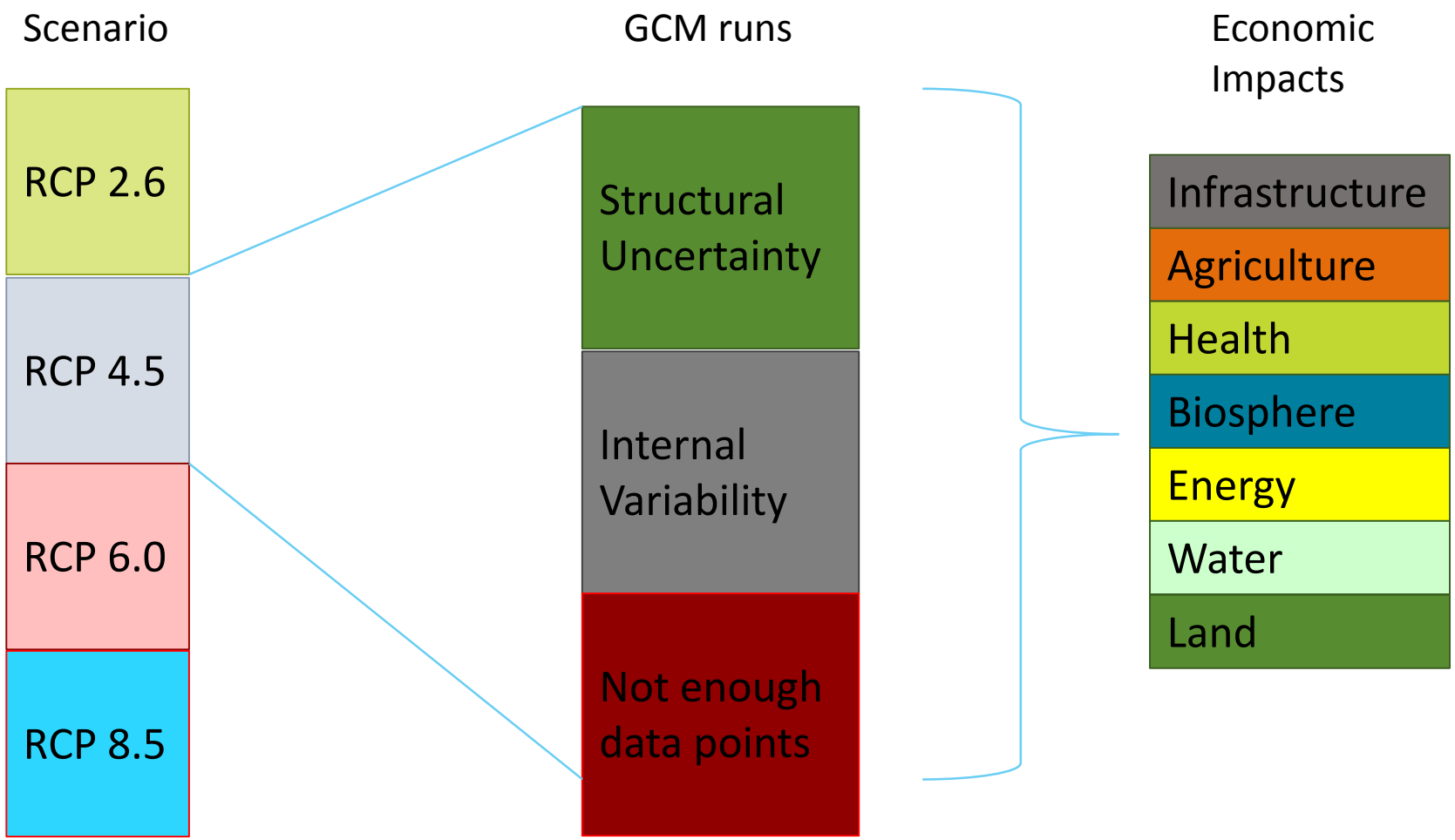
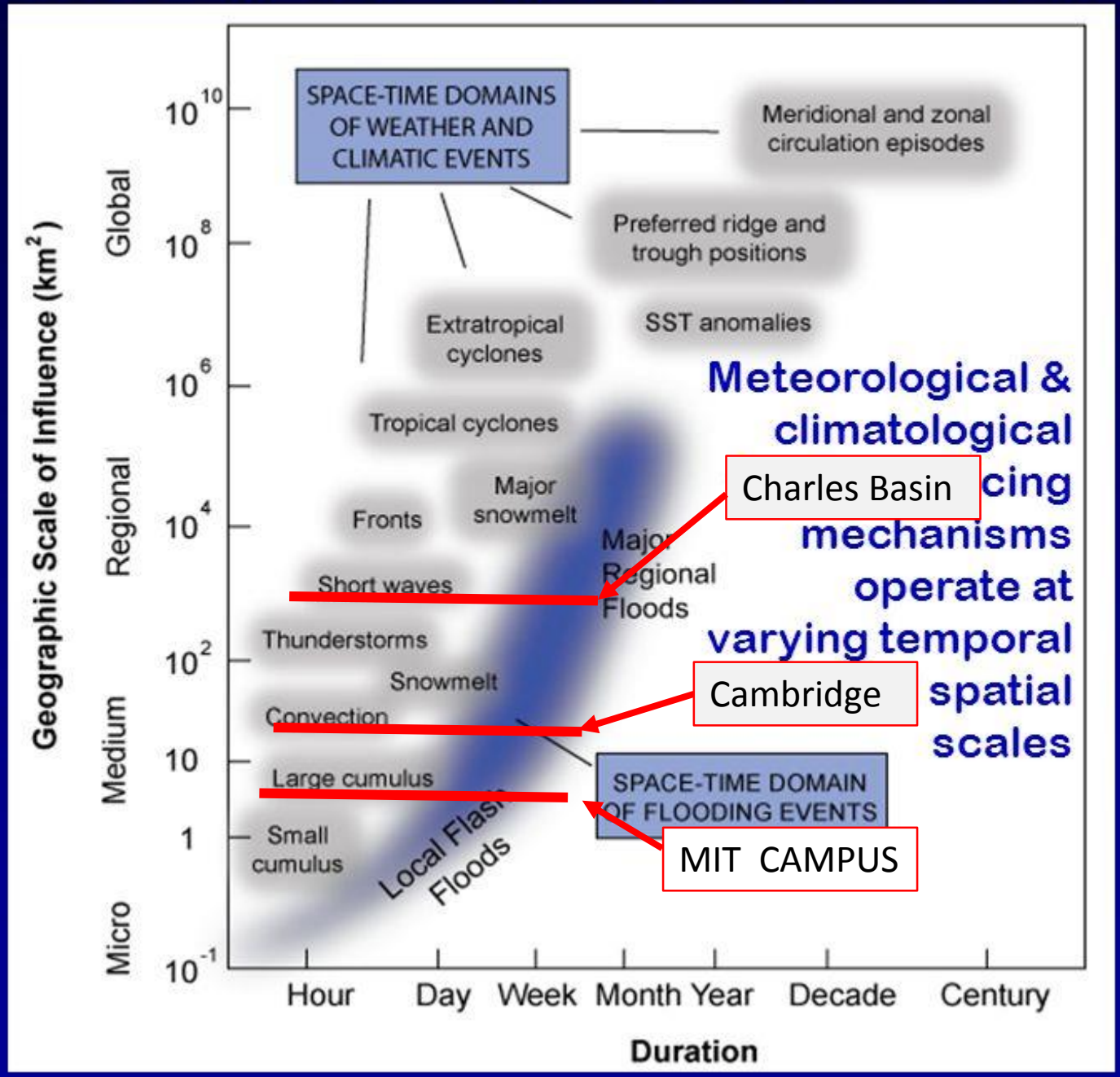
# Summary of Uncertainty



# FLOOD-CAUSING DRIVERS & MECHANISMS



# Flood Risk to Cambridge From Charles River

## PRECIPATATION

- Cloud Burst”
- Extended Precipitation over Catchment
- Ext, Precipitation >>> CB Flood Level &
  Significant Precipitation Event over Cambridge
  From Tropical and Extra Tropical Storms

Localized Flash Floods

Charles Basin Flood Level

Significant Flood Risk

Storm Surge

The 1 in 100 SS currently not a threat but after 2040 the impact of Sea Level Rise

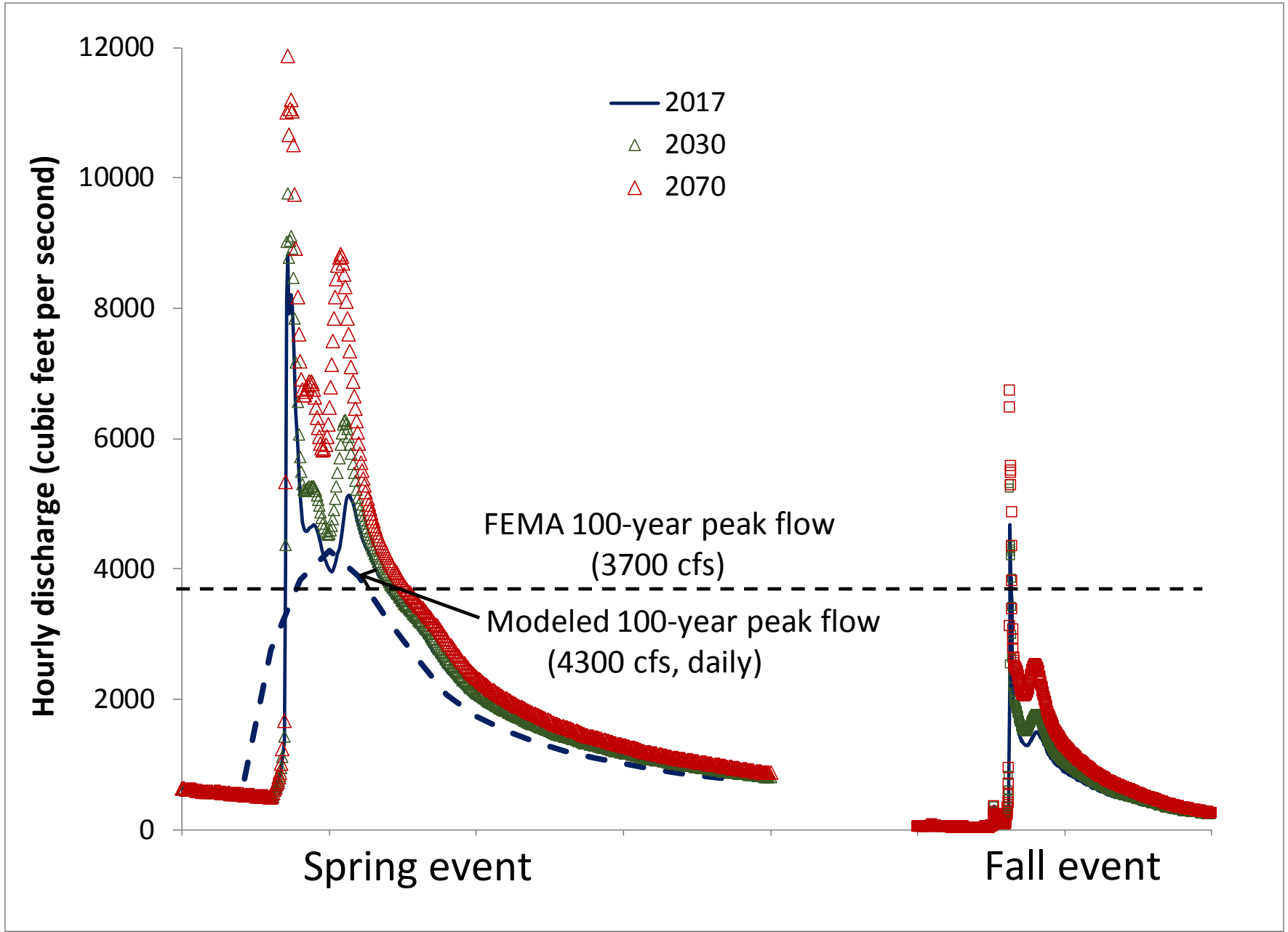
Leads to Flanking of Charles River Dam

# Analysis of annual maximum flows in Charles River at Waltham (WY 1932-2016)

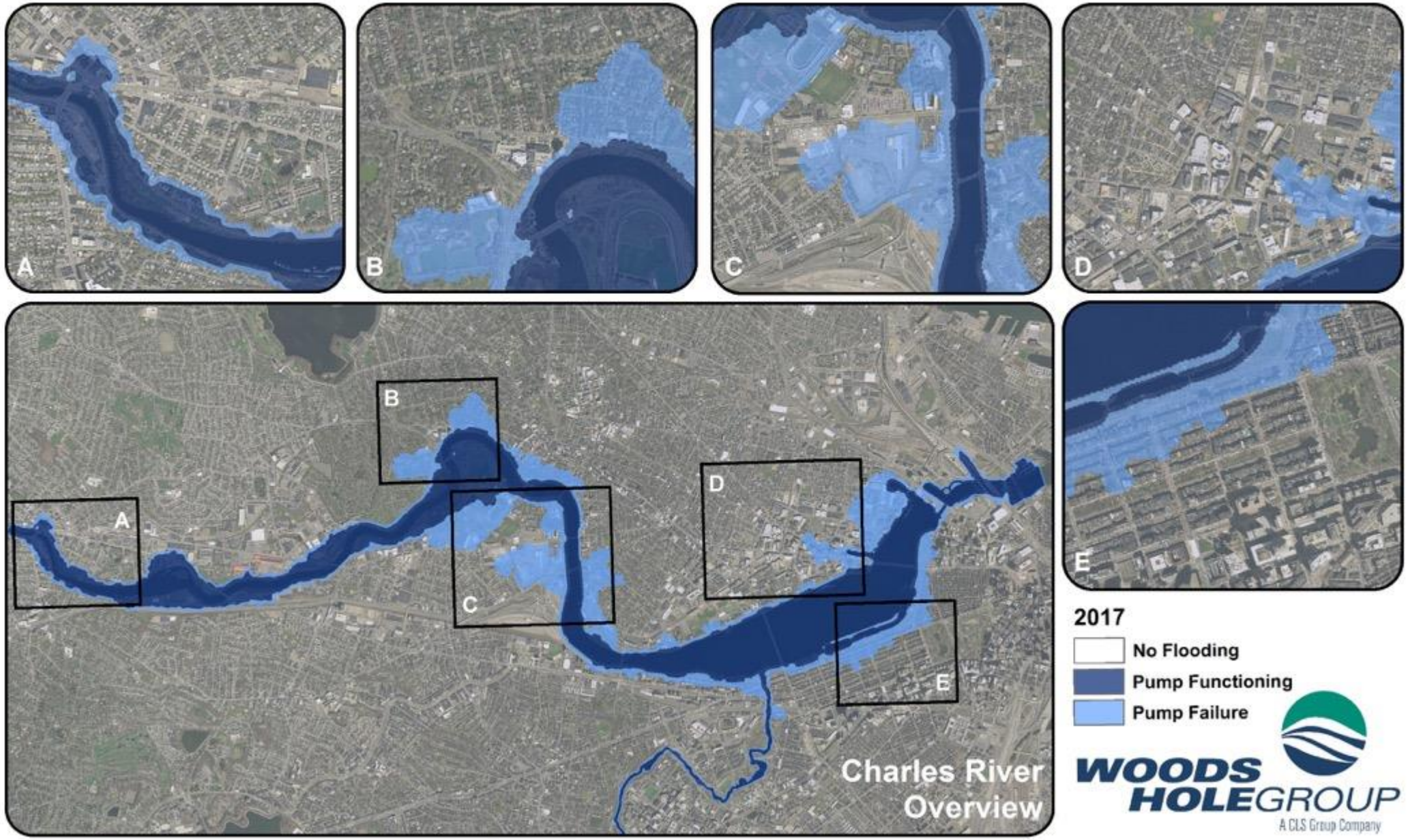

*Temporal distribution of annual max flows (WY 1932-2016)*

| Month | Number | Season | Number | Percent |
|---|---|---|---|---|
| 12 | 6 | | | |
| 1 | 7 | | | |
| 2 | 8 | DJF | 21 | 25% |
| 3 | 25 | | | |
| 4 | 21 | | | |
| 5 | 2 | MAM | 48 | 56% |
| 6 | 5 | | | |
| 7 | 1 | | | |
| 8 | 4 | JJA | 10 | 12% |
| 9 | 1 | | | |
| 10 | 3 | | | |
| 11 | 2 | SON | 6 | 7% |
| Total | 85 | | | |

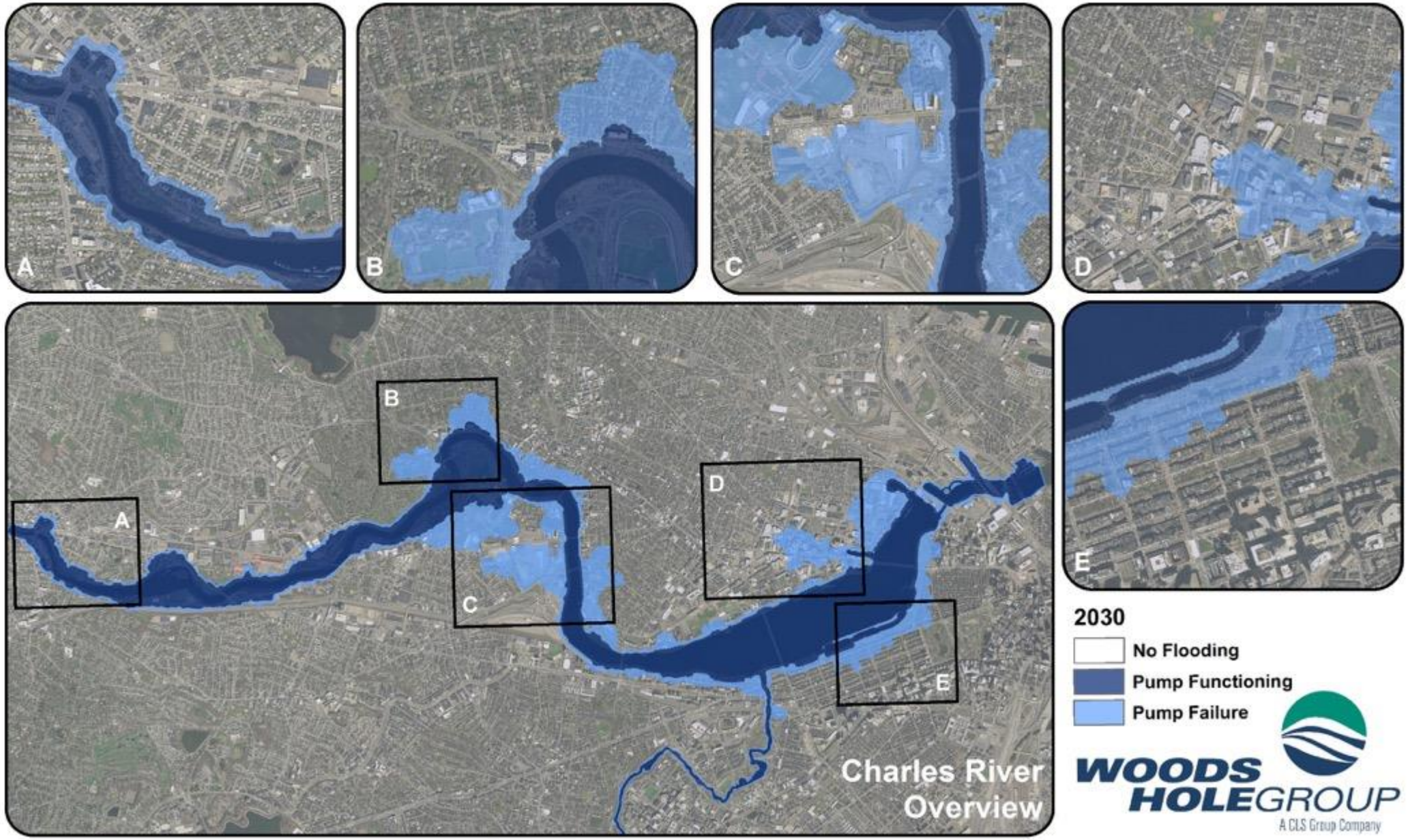
Charles inflows at Watertown dam in response to the 1% annual probability design storm under selected climate conditions and seasons.



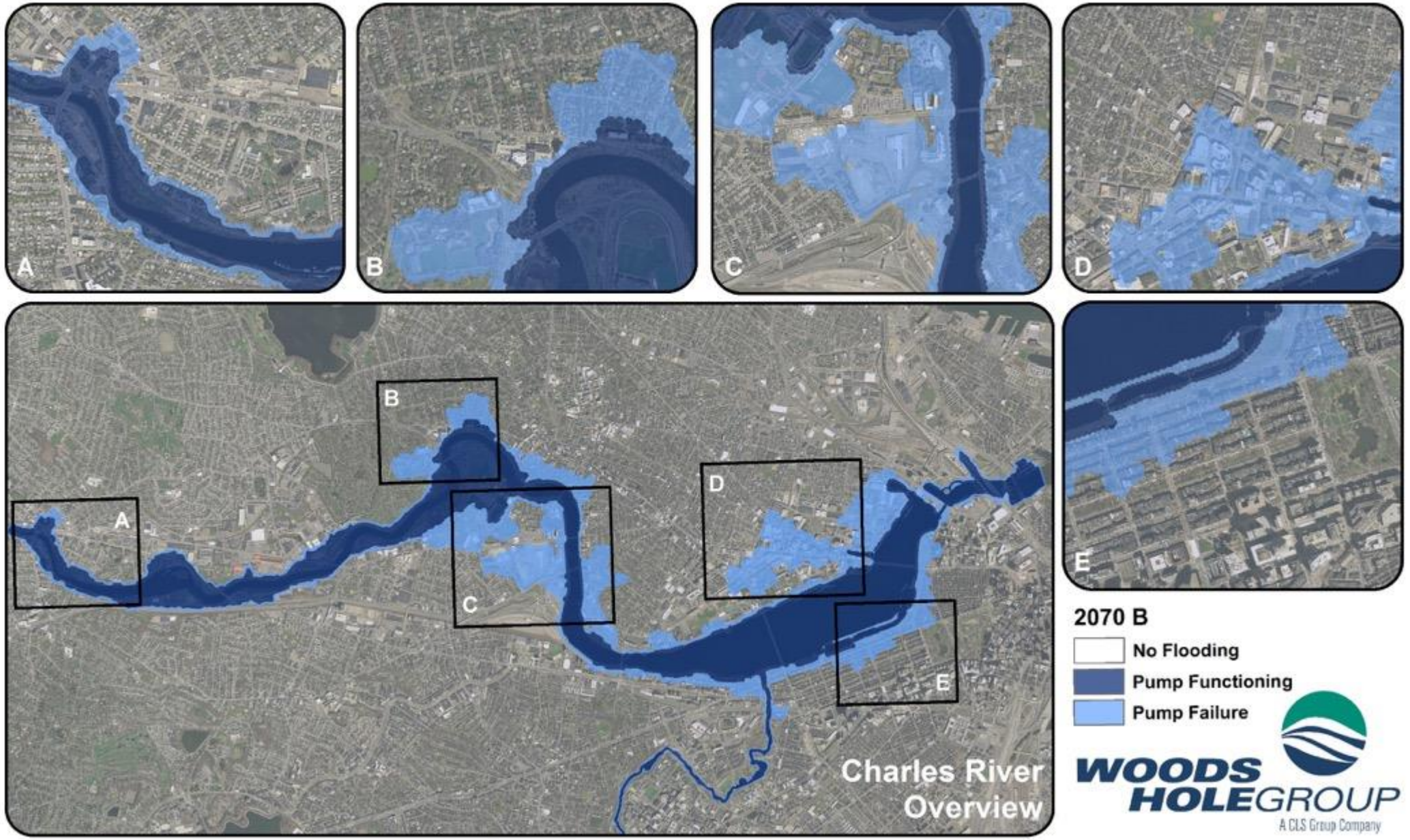
Lower Charles inundation in response to the 1% annual probability design storm (8.78 inches in 24 hours) under current (circa 2017) climate conditions.



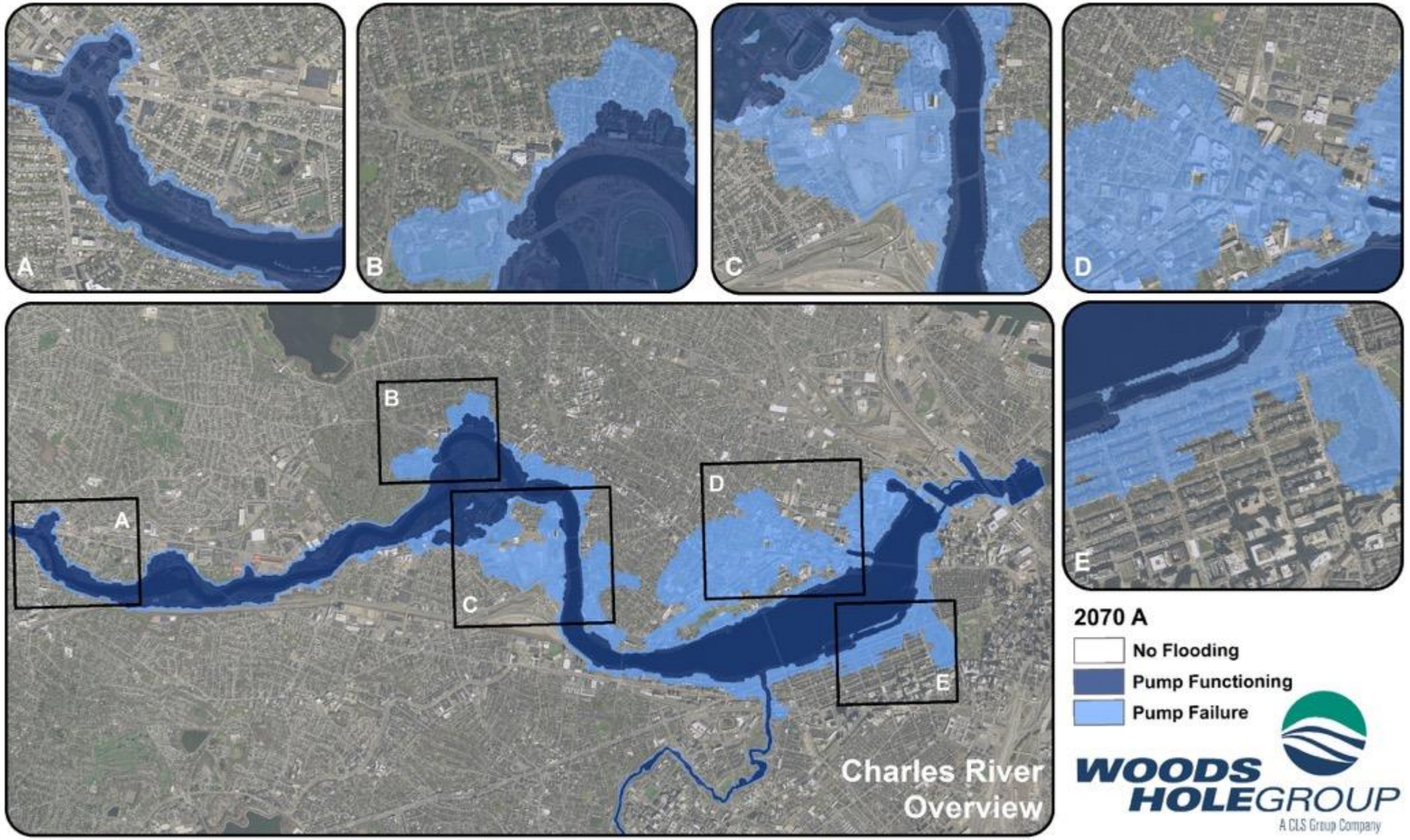
Lower Charles inundation in response to the 1% annual probability design storm (9.38 inches in 24 hours) under 2030 climate conditions.



Lower Charles inundation in response to the 1% annual probability design storm (9.81 inches in 24 hours) under 2070 (lower emissions) climate conditions.



Lower Charles inundation in response to the 1% annual probability design storm (10.60 inches in 24 hours) under 2070 (higher emissions) climate conditions.



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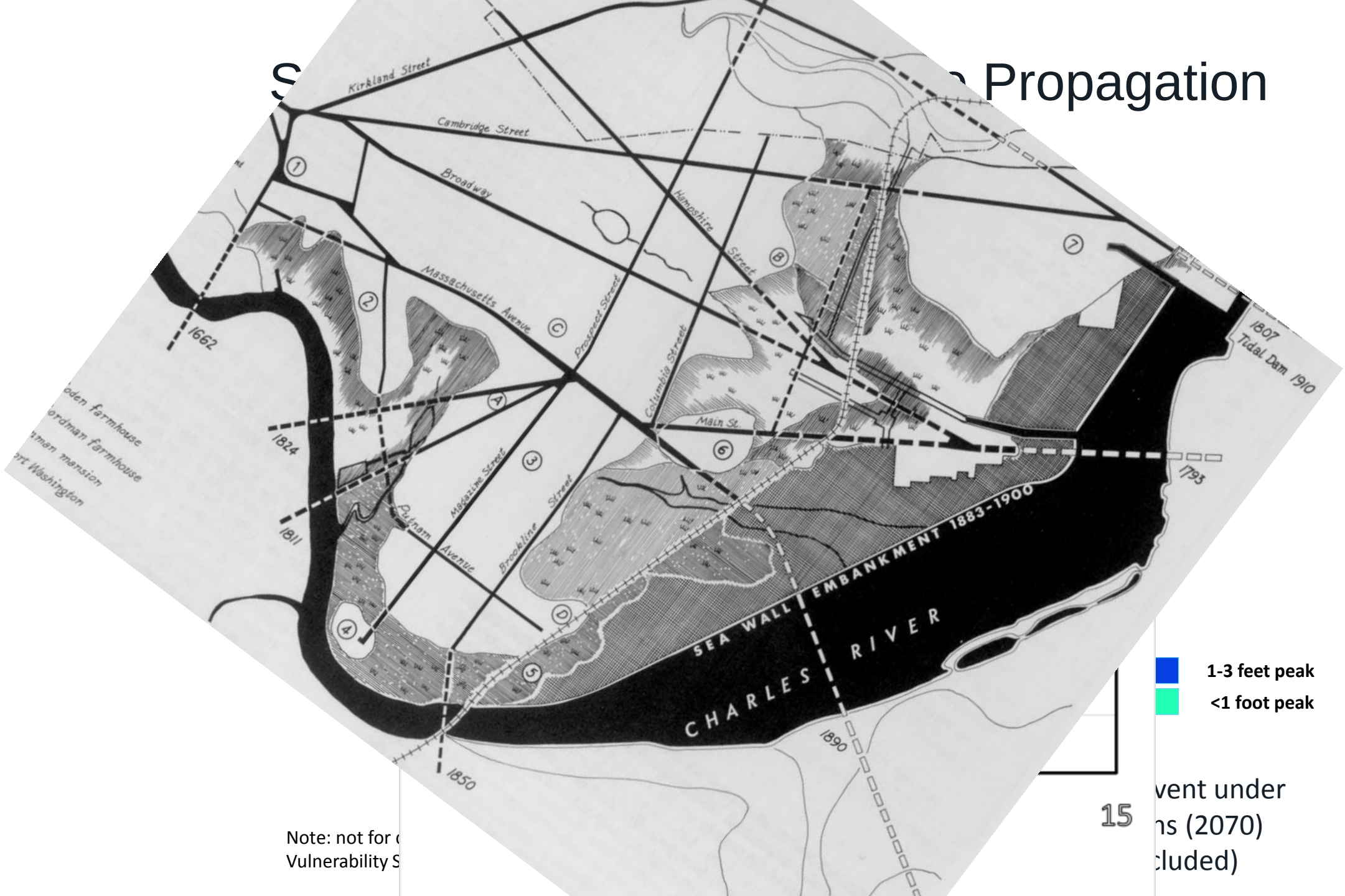
# PREC ODS

Storms dur

# S… Propagation



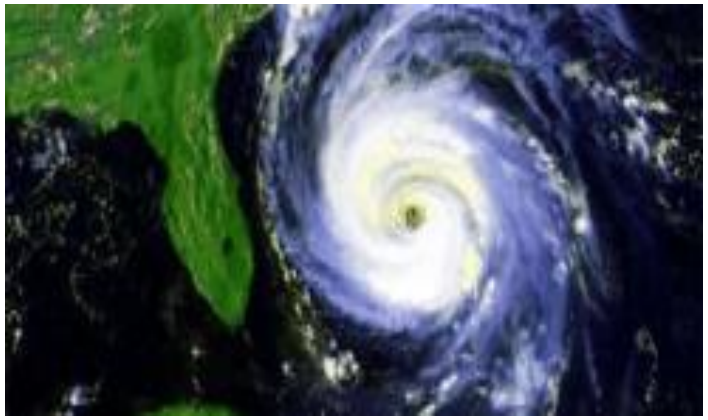

1-3 feet peak

<1 foot peak

…vent under
…ns (2070)
…cluded)

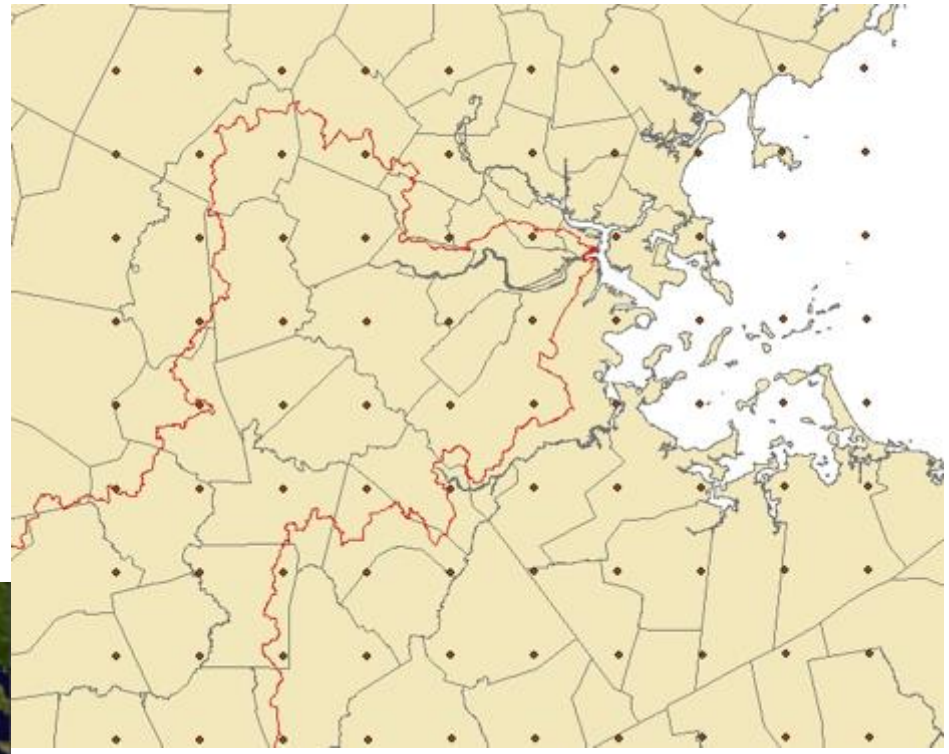
Note: not for …
Vulnerability S…

# MIT Tropical Storm Model



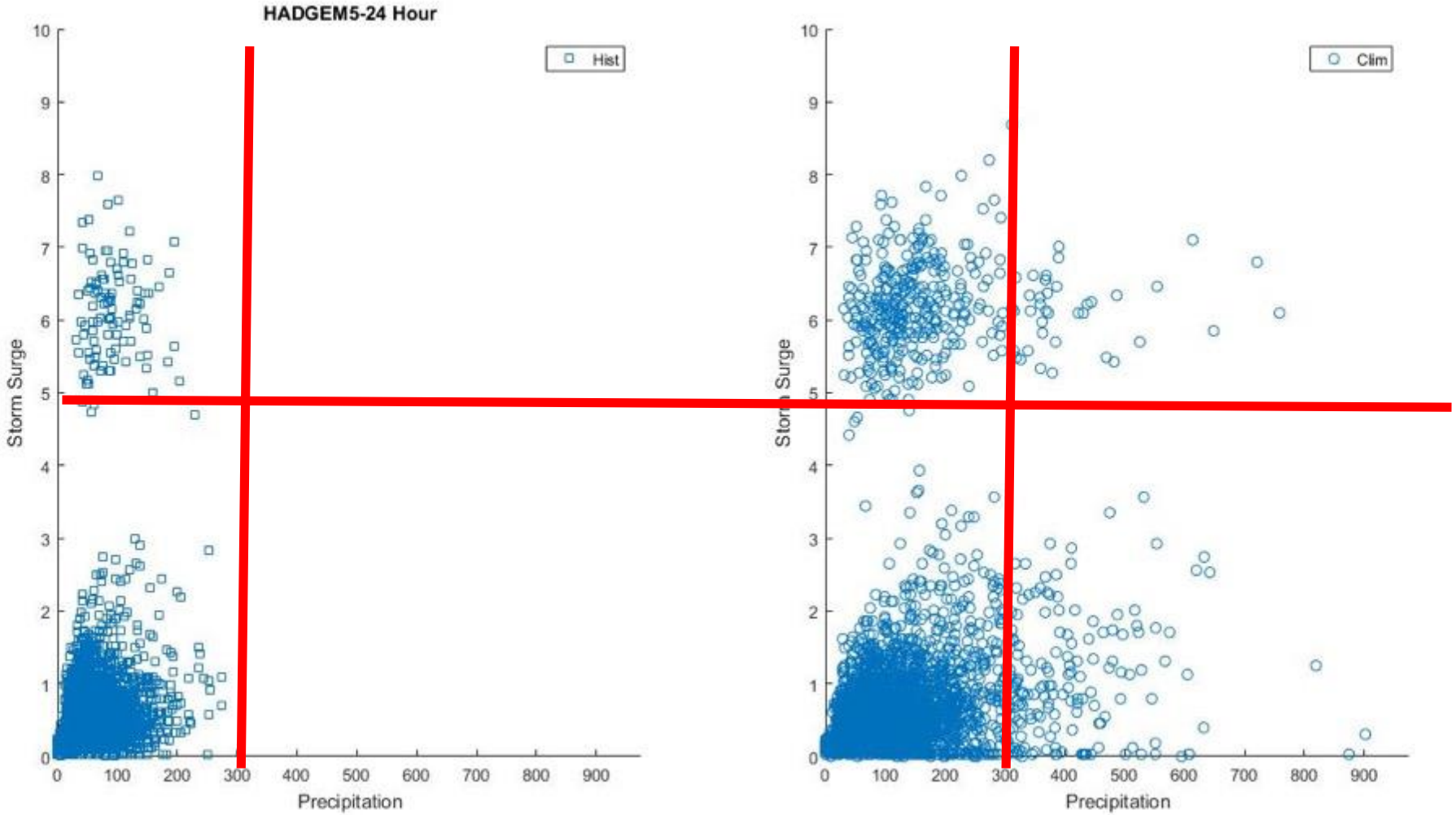
Using GCM Ocean Temperatures
Seed Tropical Storms
With Current and Future CC conditions

5000 Storms
The 72 hours over Boston

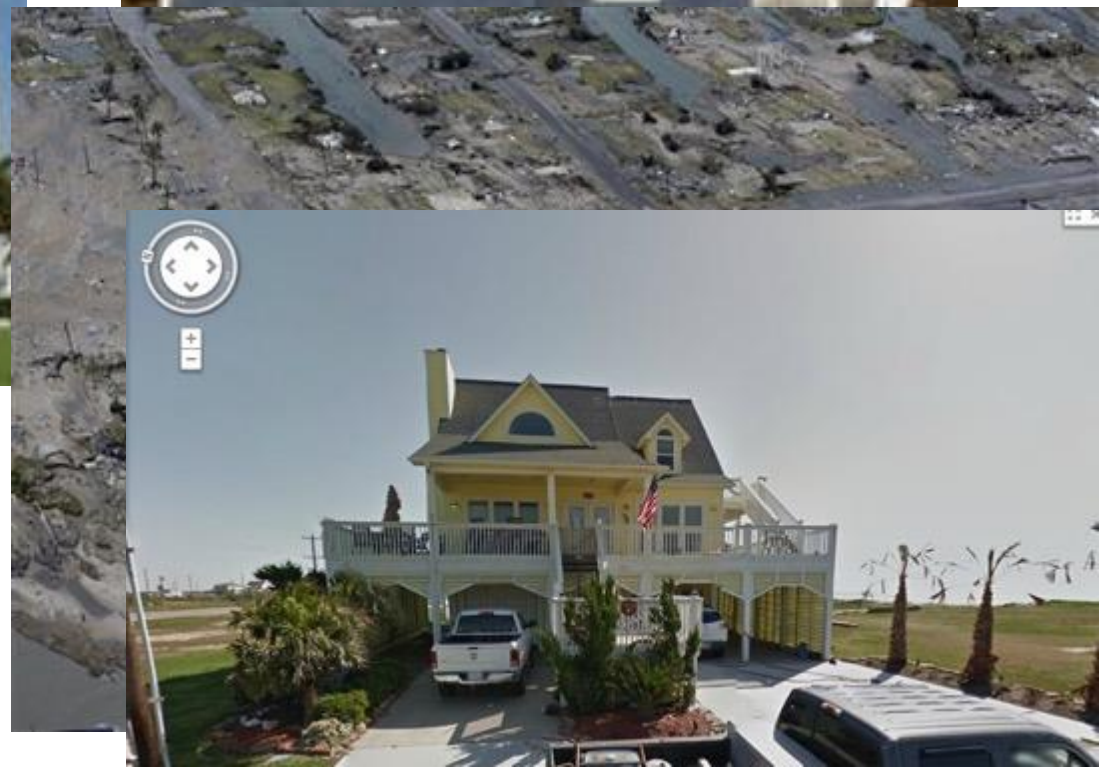


Hourly Precipitation
5Km by 5 km Grid

# MIT STCG output driven by HADGEM5 GCM : This does show a significant shift due to GHG emission in density of the joint occurrence of Extreme Precipitation and High Storm Surge and an increase in magnitude of Extreme Precipitation Events



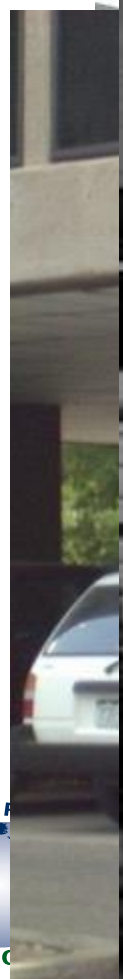
# Potential for High Adaptive Capacity: Hurricane Ike, Gilchrist, TX

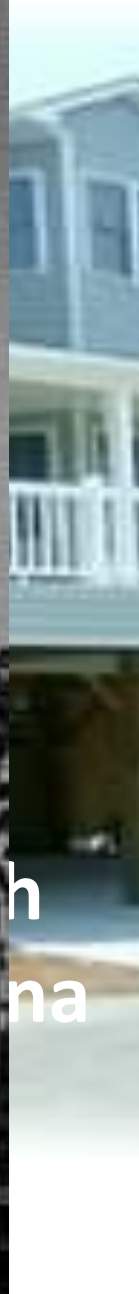


Adaptation for Flood Plain Mgt

# Back to the Future

## FLORIDA circa 1900





*Thank You*

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