A Framework for National Flood Risk Management

From a State Perspective: New York

June 3, 2015
NYS Watersheds
State Hit Hard by Larger than 100-Yr Floods

- June 2006 Tropical System (Not a Tropical Storm)
  - Near or Over 500 Year Floods: Delaware, Susquehanna and Mohawk Basins

- Spring 2011, Snow Melt and Rain
  - Over 100 Year Floods, Upper Hudson and Lake Champlain Basins; Lake Champlain hit Record Levels

- August 2011: Irene
  - 500 Year or Above: Upper Hudson, Schoharie, Catskill Streams, Lake Champlain Tributaries

- September 2011: Lee
  - Near 500 Year: Susquehanna Basin

- October 2012: Sandy
Combined 2011 Floods

EXPLANATION

Annual exceedance probability (AEP), in percent
Greater than 50
Greater than 10 to 50
Greater than 4.0 to 10
Greater than 2.5 to 4.0
Greater than 1.0 to 2.5
Greater than 0.5 to 1.0
Greater than 0.3 to 0.5
Less than or equal to 0.2

Recurrence interval (RI), in years
Less than 2
2 to less than 10
10 to less than 25
25 to less than 50
50 to less than 100
100 to less than 200
200 to less than 500
Greater than or equal to 500
Oakwood Beach, Staten Island, NYC
Coney Island, Brooklyn, NY
High Water Mark, Main Street, Schoharie, NY
Increases in Amount of Precipitation falling in Very Heavy Events*: 1958-2012


Future changes in total precipitation due to human induced warming are more difficult to project than changes in temperature. (Karl Report)

*The Heaviest 1% of All Daily Events
NYS ClimAID: Precipitation

Rainfall Volumes and Return Periods

- 5-10% Total Precipitation Increase by 2080
- 0.2” Increase in Precipitation from 100-Year Storms 1961-2100
- 100 Year Storm becomes 80 Year Storm
- Current Trends Exceeding these Models
- Research on Intense Short Rain Events is Sparse and Recent

From Tryhorn and DeGaetano, 2010
### Middle-Range Projected Sea Level Rise in New York City and Coastal Long Island

Incremental rise above 2000–2004 average baseline level

<table>
<thead>
<tr>
<th>Decade</th>
<th>Rise</th>
</tr>
</thead>
<tbody>
<tr>
<td>2100</td>
<td>21–50 inches</td>
</tr>
<tr>
<td>2080s</td>
<td>18–39 inches</td>
</tr>
<tr>
<td>2050s</td>
<td>11–21 inches</td>
</tr>
<tr>
<td>2020s</td>
<td>4–8 inches</td>
</tr>
</tbody>
</table>

Source: NYS Energy Research and Development Authority: “Climate Change in NYS, Refined and Updated Projections,” 9/14
NYS Responds

Resiliency is Key
Focus on Resilience and Strength of NYS Infrastructure

Recognizes Future with Sea Level Rise and Increased Flood Levels

More Resilient Standards Necessary for the State’s Economy
Wastewater Treatment Plants: Storm Mitigation Loan Program

- Funding through NYS Environmental Facilities Corporation
- $340 from 2013 Federal Disaster Relief Act
- 25% grant / 75% low interest loan
- New Standard in Clean Water State Revolving Fund
- Elevation Criteria: Use Most Protective Option

<table>
<thead>
<tr>
<th>Baseline Elevation for Treatment, Structure</th>
<th>Elevation for Critical Equipment (exposed to sea level rise)</th>
<th>Elevation for Critical Equipment (not exposed to sea level rise)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-year + 2 feet or</td>
<td>100-year + 5 feet or</td>
<td>100-year + 3 feet or</td>
</tr>
<tr>
<td>Sandy high-water + 1 foot or</td>
<td>Sandy high water + 4 feet</td>
<td>Sandy high water + 2 feet</td>
</tr>
<tr>
<td>500-year</td>
<td>500-year</td>
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</tr>
<tr>
<td>Sandy high water + 2 feet</td>
<td></td>
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</table>
Community Risk and Resiliency Act
Signed into Law 9/22/14

- Requires sea-level rise projections by January 1, 2016
- Adds consideration of sea-level rise, storm surge and flooding to Smart Growth Public Infrastructure Policy Act criteria
- Requires model local laws to enhance resiliency
- Requires consideration of sea-level rise, storm surge and flooding in specified facility-siting regulations, permits and funding programs
- Requires guidance on implementation and use of natural resiliency measures to reduce risk by January 1, 2017
CRRA Key Language

Noted Permit and Funding Programs Must Consider:

“The Future Physical Climate Risk due to Sea Level Rise, and/or Storm Surges and/or Flooding, Based on Available Data Predicting the Likelihood of Future Extreme Weather Events, Including Hazard Risk Analysis Data if Applicable”
Affected Permit and Facility-siting Programs

• Oil and natural gas wells
• Hazardous waste TSD facility siting
• Petroleum bulk storage
• Hazardous substance bulk storage

Major Projects:
• Protection of Waters (Stream Encroachment)
• Sewerage Service
• LNG & LPG facilities
• Mined Land Reclamation
• Freshwater Wetlands
• Tidal Wetlands
• Coastal Erosion Hazard Area
Affected Funding Programs

- Water Pollution Control Revolving Fund
- Drinking Water Revolving Fund
- Open space acquisition and maintenance agreements
- Landfill closure assistance
- Coastal rehabilitation project assistance
- Local waterfront rehabilitation programs
- Agricultural and farmland protection
EO 13690

DEC Provided Supportive Comments
• Noted History of Greater than 100-Year Floods in NYS
• Needed to Reduce Costs
• Aligns with NYS Approaches including CRRA
• Some Recommendations:
  • Improve Definition of Critical Functions
  • Require Utilization of More Restrictive State Standards
  • More Guidance on “Climate Informed Science”
    ▪ Use State Planning Approach if Based On Peer Reviewed Research
• Improve Guidelines on Public Information on Flood Risk
EO 11988 and NYS Resiliency

• Approaches Align; Goals Align
• We Can’t Afford Not To
• Sandy Alone Caused over $40 Billion Damage in NYS
• You Can’t Have a Clearance Sale for your Infrastructure!
Thank You

• William Nechamen, CFM
• Chief, Floodplain Management
• 625 Broadway, 4th Floor, Albany, NY 12233-3504

• William.Nechamen@dec.ny.gov
• 518-402-8146

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