



Sea Level Rise, Flooding, and Credit Rating – Virginia Beach

ASFPM 2018

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Floodplain Management

- Joined the NFIP in 1971
- Many higher standards in Floodplain Ordinance (updated in 2013)
 - 2 feet of freeboard
 - Restrictions on filling and new residential development in the Southern part of the city
- In the process of joining the CRS
 - Anticipating joining at a Class 8
 - Evaluated based on existing policies, programs and procedures
 - Lots of points from open space in the SFHA

City Response to Recurrent Flood Issues

- Virginia Beach City Council provided funding for a comprehensive sea level rise and recurrent flooding assessment and response plan in FY15
- Dewberry, a national consultant firm, retained by the City to conduct study in January 2015
- City awarded \$850k grant from NOAA in March 2016

Study Goal and Outcomes

Goal:

Produce information and strategies that will enable Virginia Beach to establish long-term resilience to sea level rise and associated recurrent flooding

Outcomes:

- A full understanding of flood risk and anticipated changes over planning and infrastructure time horizons
- Risk-informed strategies, including engineered protection and policy to reduce short and long-term impacts
- City-wide and watershed “action plans” for strategy implementation
- A fine-tuned public outreach process to advance resilience initiatives

Project Overview

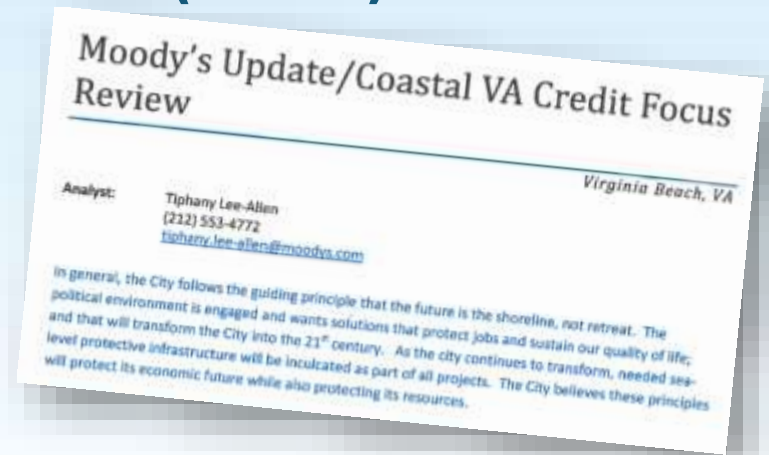
- **Phase 1: Sea Level Rise and Recurrent Flooding Impacts**
 - Identify the location, frequency and potential cost of existing and future flood risk to the City
- **Phase 2: Adaptation Strategies**
 - Develop, assess and prioritize a range of strategies (planning, policy, and engineering)
- **Phase 3: Implementation**
 - Integrate the best- performing adaptation strategies in actionable plans to ensure implementation. (How to we sequence, fund, and get public buy-in for projects)

VB SLR Planning Scenarios

Life Cycle Alignment	Time Horizon/ Time Period	SLR Value	Relevance	Use
Municipal Planning	20-40 years 2035-2055	1.5 ft	Comprehensive Plan & Outcomes Commercial and Utility life-cycles	Vulnerability assessment Key planning value Basis for evaluation of all adaptation strategies
Critical Infrastructure Long-term awareness Adaptive Capacity	50-70 years 2065-2085	3.0 ft	Utility Infrastructure life-cycle Transportation infrastructure lifecycles Residential structure lifecycles	Secondary vulnerability assessment to provide insight into long-term risk Basis for long-term infrastructure decisions Evaluate cost-effectiveness of additional protection for adaptable resilience strategies

Moody's Questionnaire to VB (2015)

- Does the existing/future CIP include spending for mitigation or resiliency?
- Has your governing body discussed the capital or financial implications of rising sea levels?
- Has there been an estimate on potential impacts from rising sea levels or flooding?
- **Please discuss how flooding has impacted the city's budget and how flood mitigation efforts may impact future budgets?**
- Have there been any zoning /long-term planning adjustments downtown and along the waterfront to mitigate future flooding impacts?
- **What is management's current view on the potential impact/vulnerabilities in your community from rising sea levels and a heightened risk of extreme weather events?**



Opening our eyes - 2016

- **July 31 - heavy rainfall**
 - 500 to 1000-yr recurrence interval at the 2-hr duration
- **September 19 – Julia**
 - 100 to 200-yr event at the 24-, 48-hr durations
- **October 8-9 – Matthew**
 - 500 to 1000 event at the 24-hr durations



Moody's (2017)

Bloomberg ▾

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Moody's Warns Cities to Address Climate Risks or Face Downgrades

By **Christopher Flavelle**
November 29, 2017 4:00 AM
From **Climate Changed**

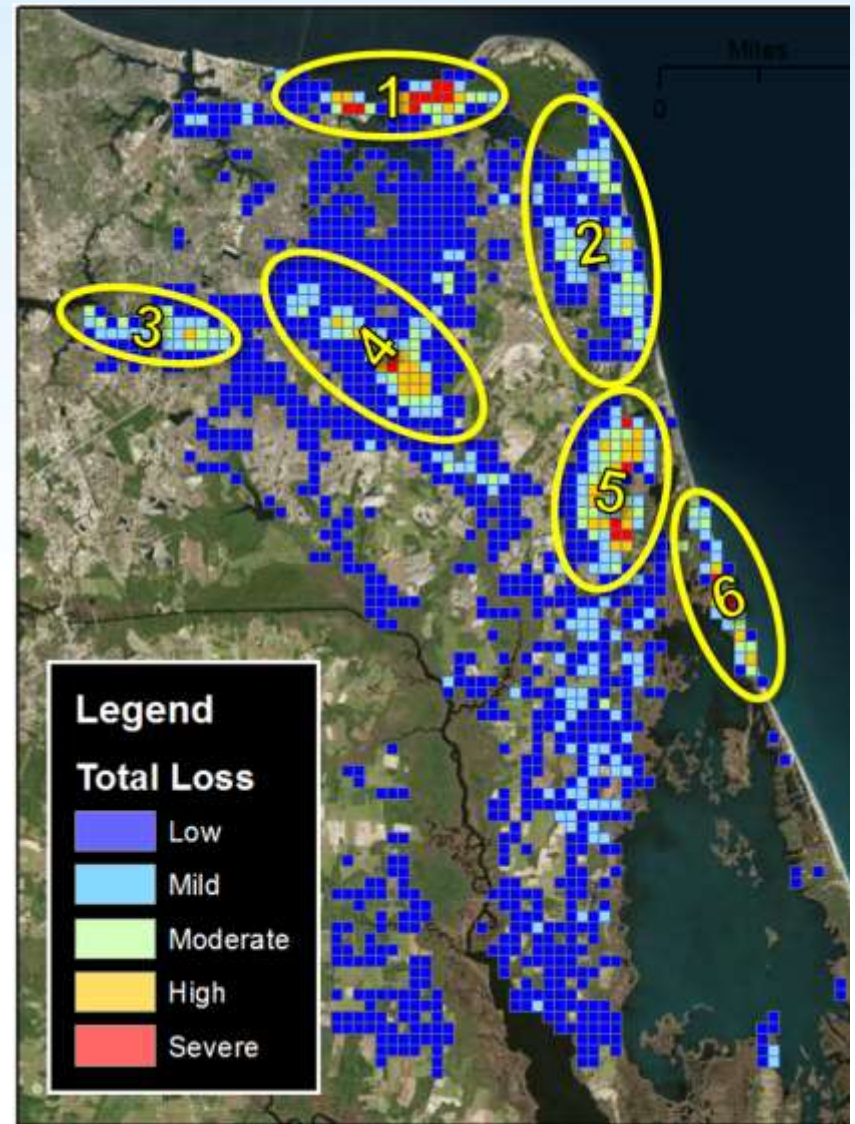
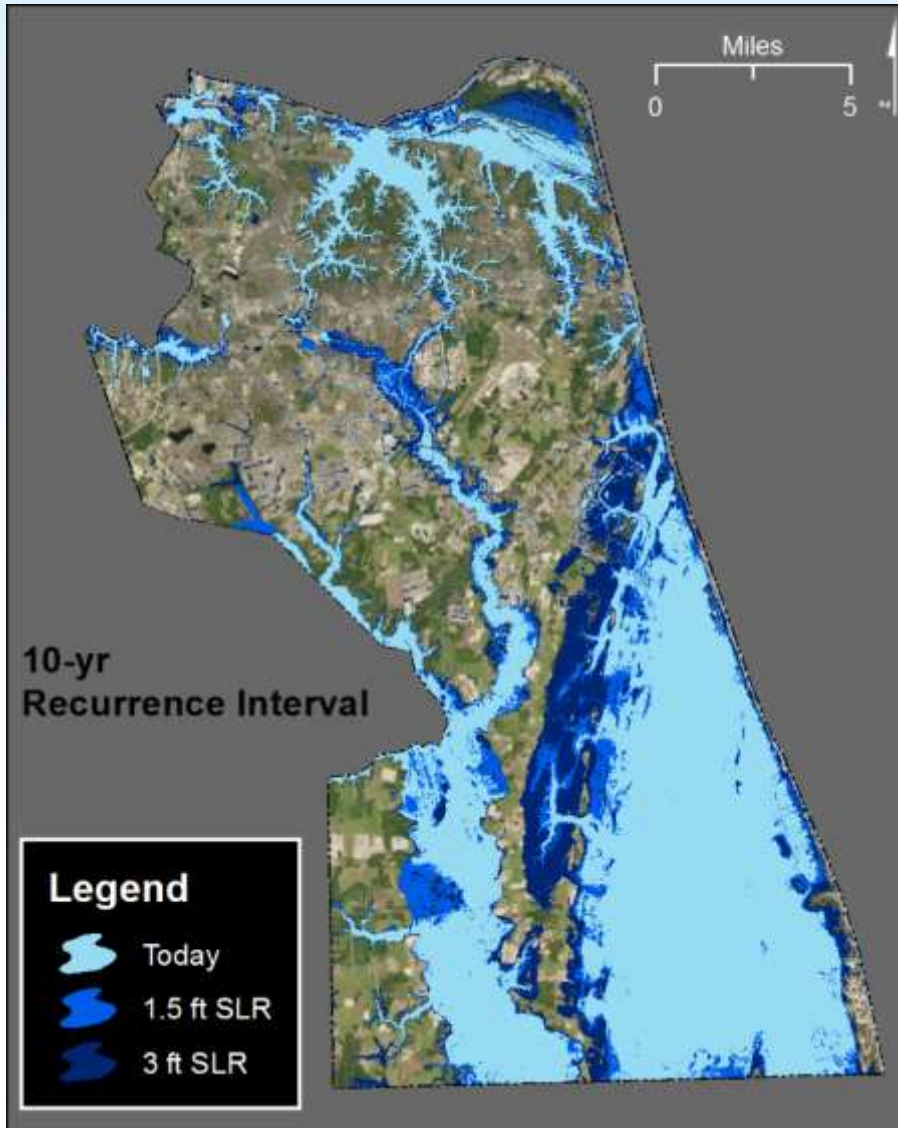
In a report to its clients Tuesday, Moody's Investors Service Inc. explained how it incorporates climate change into its credit ratings for state and local bonds. If cities and states don't deal with risks from surging seas or intense storms, they are at greater risk of default.

"What we want people to realize is: If you're exposed, we know that. We're going to ask questions about what you're doing to mitigate that exposure," Lenny Jones, a managing director at Moody's, said in a phone interview. "That's taken into your credit ratings."

<https://www.bloomberg.com/news/articles/2017-11-29/moody-s-warns-cities-to-address-climate-risks-or-face-downgrades>

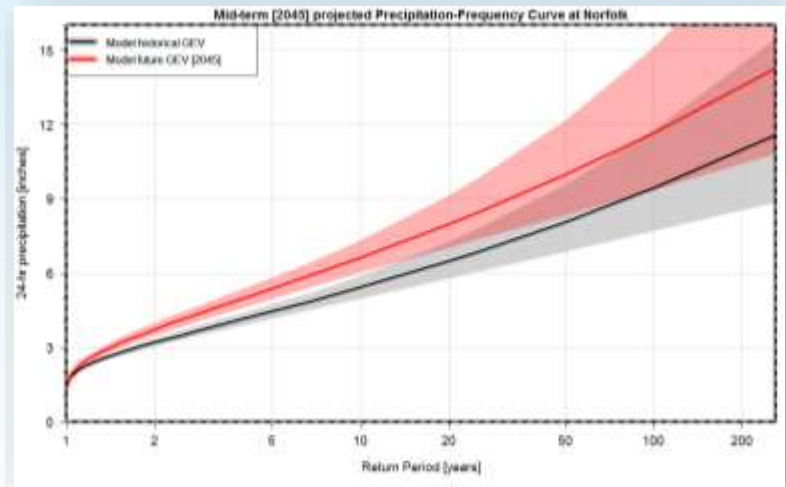
Pulling It All Together – The Data

Flooding Impacts and Focus Areas



“Whole Picture” Analyses - Precipitation

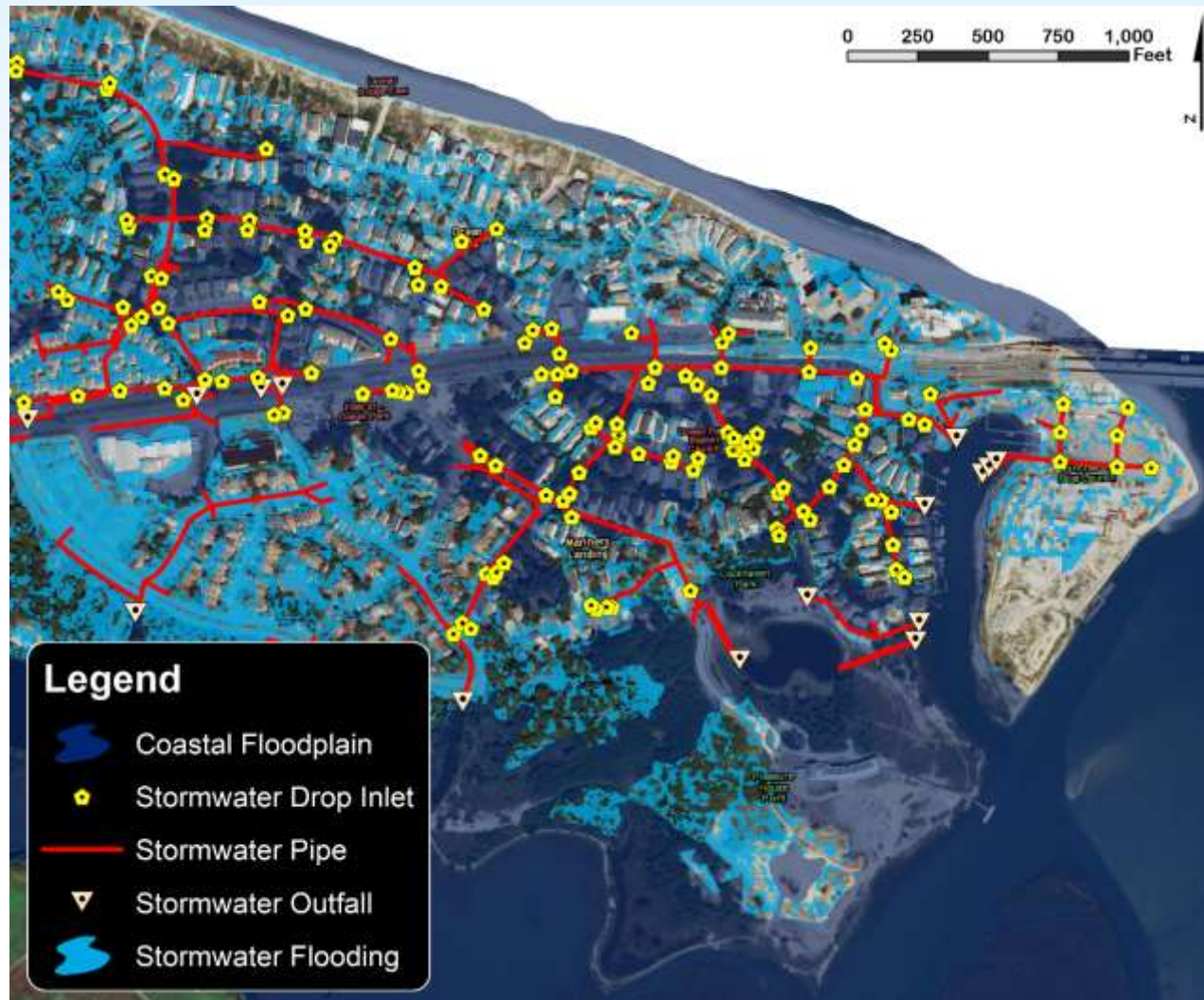
- Rainfall/surge correlation
 - >50% of rainfall events occur during elevated water levels
- Joint-probability of rainfall/storm surge
 - Concurrent rainfall/surge design values
- Regional Precipitation Trends
 - Heavy rainfall increasing
- Future precipitation conditions
 - Potential 20% increase in design rain



Return Period	Historical Value (Atlas 14)	Recommended New Value	Increase
years	inches	inches	%
1	3.00	3.60	20
2	3.65	4.38	20
10	5.64	6.77	20
25	6.99	8.39	20
50	8.26	9.91	20
100	9.45	11.34	20

Combining Storm Surge with Stormwater

- Higher coastal water levels diminish stormwater system performance



Credit Rating

- Taking steps to understand our future risk and have an implementable plan of action
 - 5-year stormwater fee increase
 - Aggressive CIP Plan for flood control projects
 - Additional staff and program changes as part of MS4 requirements
- Work to maintain stable finances and a AAA bond rating
- Bonds issued on completed work
- Concerns:
 - When assessments start to decrease
 - When insurance is becoming unaffordable

Going Forward

- We already have tons of data
- Biggest need is to be able to anticipate future flood risk so we can plan for it today

Questions?

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