City of Virginia Beach

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October 11, 2013

The Honorable Members of City Council

Subject: 2014 Legislative Agenda – Recurring Flooding Item

Dear Council Members:

I would like to propose an additional item for our legislative agenda dealing with recurrent flooding. The City of Norfolk will request the General Assembly establish and fund a Joint Study Committee to investigate and make recommendations on recurring coastal flooding in Virginia. As Council is well aware, the recurrent flooding issue is of great concern to our citizens. A recent study predicted the City of Virginia Beach could lose 60-square miles of land area to an increase of approximately one-foot in sea level. This will be thousands of acres of farm land in the southern part of the city as well as in the lower elevation areas in the northern part of the city. Attached is the request proposed in the Norfolk legislative package. I would respectfully request we add this as an item in our legislative agenda. We believe at this time that we would not be asking our Delegation to carry it on our behalf but to ask that they support the authorization of the study.

For your information, please see a presentation that I made at a recent multi-disciplinary group meeting on this issue at William & Mary. I also call your attention to the website for the Secure Commonwealth Panel looking at recurrent flooding:

http://www.vahs.virginia.gov/Agencies/SCP/index.cfm

Unless Council objects, I will ask staff to include this in our agenda of adoption at our October 22 meeting.

Sincerely,

William D. Sessoms, Jr.
Mayor

Attachments:

1. Legislative Request #1 – City of Norfolk Legislative Agenda Item
2. Minutes from Recurring Coastal Flooding Subpanel of the Secure Commonwealth Panel
3. PowerPoint – Framework for Addressing Coast Flooding in Virginia Beach
4. Mayor's Speech – Adaptive Planning for Flooding and Coastal Change in Virginia
5. PowerPoint – Recurrent Flooding Study for Tidewater Virginia

cc: The Honorable Paul Fraim, Mayor, City of Norfolk
Management Leadership Team
Robert Matthias, Assistant to the City Manager
Phil Davenport, Interim Director, Public Utilities
Phil Rohrs, Public Utilities
Principle Advantage

Legislative Request # 1: The City of Norfolk requests the General Assembly to establish and fund a Joint Study Committee to further investigate and make recommendations on recurrent coastal flooding in Virginia.

The 2012 General Assembly of the Commonwealth of Virginia unanimously passed SJR 76, 2012: Recurrent Flooding Study of Tidewater Virginia and commissioned a study to evaluate Virginia's coastal communities' current capabilities to identify and implement comprehensive adaptation strategies to mitigate recurrent coastal flooding. The study was conducted by the Virginia Institute of Marine Sciences (VIMS) and published as Senate Document No.3 January 2013 (VIMS Report).

The VIMS Report concludes Virginia localities are not adequately equipped to address and implement meaningful flood mitigation strategies required for responding to predicated relative sea level rise on their own. Within the VIMS Report, there are a series of simulations that show impacted areas as influenced by: a) storm surge, b) sea level rise, and c) the recurrences of storms making land fall within the region. All of these factors both individually and collectively, are anticipated to increase the frequency and the severity of coastal flooding events. This will increase damages to public and private property, amplify impacts to public safety, and increase disruption to individuals and the economy. Left unaddressed, the Commonwealth can reasonably anticipate that it will see significant and profound coastal flooding now and into the immediate planning horizon.

This contention supported by the VIMS Expert Advisory Panel is that Virginia localities are overwhelmed by the magnitude of the recurrent coastal flooding challenge and do not have sufficient technical resources to define and address the coastal flooding risks. Further, Virginia local governments lack the framework and structure for responding to and planning for future significant recurrent coastal flooding events, nor the financial resources or regulation authority to implement necessary comprehensive flood mitigation solutions.

To mitigate these shortfalls, the VIMS report strongly recommends that the state take a stronger leadership role to incorporate flood and sea level rise management into their purview. It also recommends the state take ownership of the necessary integration role between the localities and the appropriate federal agencies.

Recurring Coastal Flooding Subpanel of the Secure Commonwealth Panel

House 1, Virginia State Capitol, 1000 Bank Street, Richmond, Virginia 23219
Wednesday, September 25 @ 1100

Meeting Minutes

Panel Members Present:

Senator John Watkins (Co-chair)
Mr. Jim Redick (Co-chair)
Secretary Doug Domenech
Mr. Mike Landefeld (for Secretary Jim Hopper)
Delegate Margaret (Margi) Vanderhye
CPT John Korka (for RADM Dixon Smith)
Ms. Janine Burns
Mr. Paul Conway
Mr. Joe Bouchard
Mr. Bret Burdick (for Mr. Michael Cline)
Mr. Dwight Farmer
Ms. Michelle Hamor
Mr. Jeb Wilkinson (for Mr. David Johnson)
Mr. David Paylor

Additional Staff Support:
Bryan Pennington
Latoya Vaughn

Agenda Item #1 – Welcome and Introductions

Welcome by Senator Watkins

Co-Chair Senator Watkins discussed the importance of the subpanel and other flood mitigation efforts being conducted including a Homeland Security Planning and Management JLARC study due in October 2013. The Senator also stated that the task for this meeting will be to develop a schedule for the future and assign sub-groups for research.

Agenda Item # 2 – The Virginia Institute of marine Science (VIMS) reviews Senate Document 3, 2013: " Recurrent Flooding Study for Tidewater Virginia," Ms. Molly Mitchell

Presentation slide are included as an attachment.

Agenda Item #3 – Key finding and next steps, Jim Redick, Director of Emergency Preparedness and Response City of Norfolk and Co-chairman of the Subpanel.

Co-Chair Mr. Redick provided the Subpanel with an overview of the key issues and recommended the formation of smaller issue –specific workgroups (the workgroups are envisioned to be comprised of subpanel members and identified experts). Mr. Redick also introduced the group to the working document where a collection of data through a variety of

sources has been (and continues to be) entered and categorized by the respective VIMS recommendations. He asked the Sub-Panel members to review the document and provide input. Likewise, to ensure an inclusive and comprehensive approach, he further announced all participating technical expert agencies and partners would have the opportunity to review and comment on the material.

Agenda Item #4 – Additional Business, including discussing future meeting dates (meeting dates for the workgroups and subpanel)

Summary of Additional Comments and Observations:

The group agreed on three overarching areas on which to focus:

1. Prevention
2. Protection of Property through Policy (to include strategies for rebuilding)
3. Awareness of the Competition for Resources Among Other States/Regions

Likewise, there must be a discussion and agreement about what success means, how it will be measured, and that which is idealistic versus realistic. This includes establishing short, medium and long term goals. Furthermore, the group must be cautious of recommendations that could impact other areas or cause unintentional consequences.

In terms of competition, Virginia has great assets, but is not yet competitive for federal resources. Other states are further along in the efforts and it is important to assess the state's ability to compete against other states for federal funding. Becoming competitive will require the Virginia delegation to be well informed and knowledgeable of the subject matter.

Additional discussion is categorized as follows:

Unity of Effort

Ms. Hamor commented that the U.S. Army Corps of Engineers North Atlantic Division is conducting a comprehensive study from Virginia to Maine as directed by Congress in response to Hurricane Sandy. The report looks at vulnerability for the coast and sea level rise now and in the future. The Army Corps Norfolk Region is continuing efforts to make sure Virginia's voice is heard. The group opined it often takes an event to get attention. The threat is present and there are limited resources.

One observation involved the chain of command for both the Army Corps of Engineers and FEMA. While there are shared interests at all levels, and great relationships at the local level, USACE reports to the Department of Defense while FEMA is part of the Department of Homeland Security. These parallel channels make it challenging to align priorities and resources.

Economic Impact

Another significant issue moving forward is the importance of financial analysis / quantifying economic data related to flood damage throughout the Tidewater and the Commonwealth. Additionally, efforts should be taken to identify which government resources are likely to be impacted.

One economic concern has to do with the recent changes to flood insurance and the (in)ability of home and business owners to secure or maintain insurance for their property. Additionally, while costs may be more actuary, the rise in flood insurance costs has an impact on one's ability to sell their home, which can decrease property value, and ultimately impact real estate taxes at the local level. Likewise, there was concern regarding the further decline in land tax revenue for areas which may need to be transitioned into wetlands.

The important role of the insurance industry was also discussed, with mention of the North Carolina Coastal Property Insurance Pool where insurance companies pooled together to insure high risk properties. There was a past attempt to introduce legislation to develop something similar in Hampton Roads (~15 years ago) but with no success.

Critical Infrastructure / Key Resources (CI/KR)

In addition to identifying government impacts, the threat to Critical Infrastructure / Key Resources – most of which is owned and operated by the private sector – is also a critical component.

One of the most critical assets in the region is the Department of Defense. There was discussion about the Navy's efforts and their taking into account flooding to piers, which is reflected in the recent modifications to Craney Island. There was also mention of the Hampton Roads Transportation Planning Organization's (HRTPO's) Report: "Hampton Roads Military Transportation Needs – Roadways Serving the Military and Sea Level Rise/Storm Surge." A separate effort underway has been the Homeland Security Regional Resiliency Assessment Program (RRAP) which focuses on the transportation network in Hampton Roads. (This latter report has not yet been finalized). The interest was expressed in conducting similar assessments for all Critical Infrastructure and Key Resources (CI/KR) in the Commonwealth vulnerable to recurrent flooding, with the acknowledgement it would require significant and on-going collaboration with the private sector (power, cable, etc.). It was also understood loss of these assets could stifle disaster recovery efforts.

One addition report mentioned during the meeting focused on the military risk assessment of recurrent flooding / sea level rise at Naval Station Norfolk. This report will be provided to sub-panel members with announcement of a presentation on the report by Ms. Kelly Burkes-Copes at Old Dominion University later in October. Co-Chair Senator Watkins recommended inviting Ms. Burkes-Copes to present for the Sub-Panel as well.

Legal

It was mentioned efforts should be taken as part of the Sub-Pane's approach to revisiting and otherwise exploring Virginia laws regarding property owner's rights and addressing protection needs.

Mapping

The issue of mapping resources and the use of LIDAR data was also discussed. Senator Watkins mentioned the availability of LIDAR data and other resources housed with VITA's Virginia Geographic Information Network (VGIN), which can be found online at http://www.vita.virginia.gov/isp/default.aspx?id=12104.

> *After the meeting it was also found that VGIN partners with William and Mary Geospatial Analsysis with LIDAR data available for various locations throughout coastal Virginia – found here).*

Senator Watkins advised that the next meeting will be scheduled in late October, possibly in Hampton Roads. The Co- Chairs will work on assigning work groups and look into scheduling a presentation by Kelly Burkes-Copes.

Adjourned

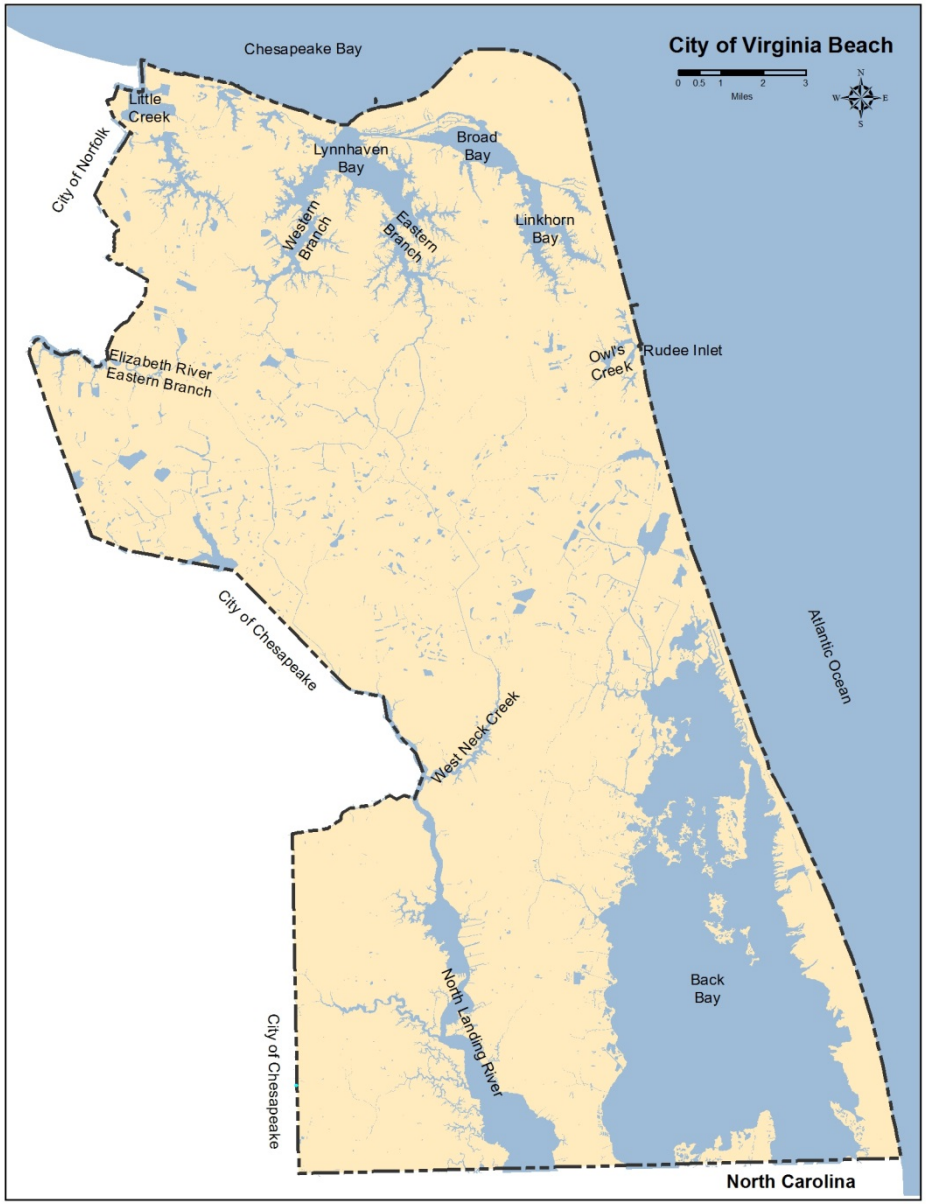
Framework for Addressing Coastal Flooding in Virginia Beach: Challenges and Needs

Mayor Will Sessoms

Adaptive Planning for Flooding and Coastal Change in Virginia:
Legal and Policy Issues for Local Government

The College of William & Mary

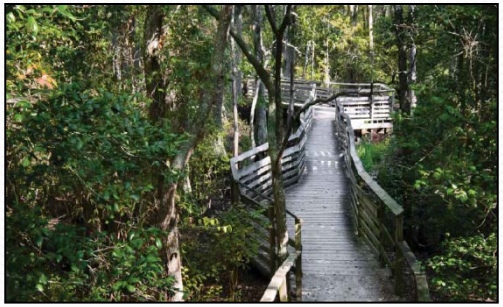
September 13, 2013



City of Virginia Beach









City of Virginia Beach

Plans and Policies

- Beach Management Plan
- Comprehensive Plan
  - Environmental Stewardship
  - Southern Watersheds Management Plan
  - Strategic Growth Area Master Plans
- South Hampton Roads Regional Hazard Mitigation Plan
- City Strategic Plan
- A Community Plan for a Sustainable Future

City of Virginia Beach

Plan Implementation - Regulatory

- Floodplain Regulations
- Chesapeake Bay Preservation Area Ordinance
- Tidal Wetlands Ordinance
- Coastal Primary Sand Dune Ordinance
- Erosion and Sediment Control Ordinance
- Stormwater Management Ordinance
- Southern Watersheds Management Ordinance
- Zoning Ordnance
- Site Plan Ordinance
- Subdivision Ordinance

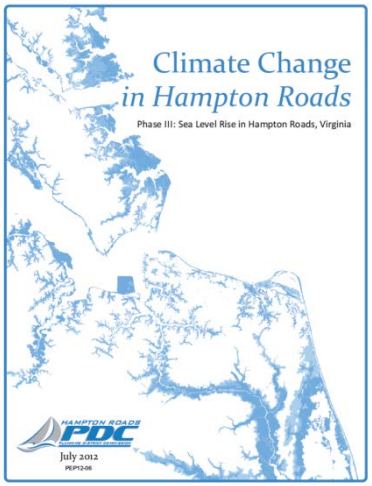
City of Virginia Beach

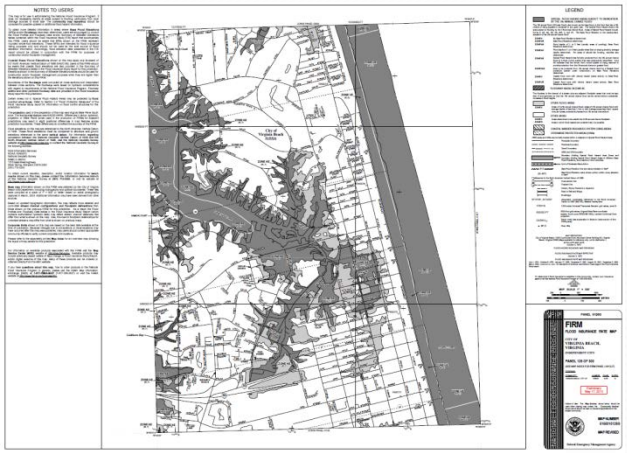
Plan Implementation - Teamwork

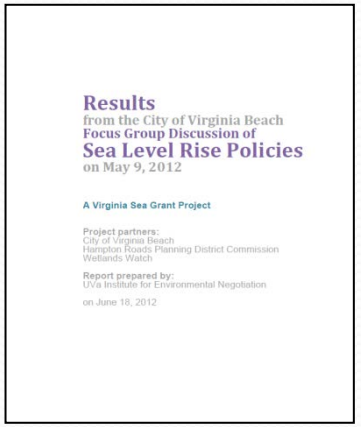
- Beach Nourishment & Management: Public Works, Parks & Recreation, Beaches & Waterways Advisory Commission
- Coastal Flooding & Stormwater Management: Public Works, Planning
- Recurrent Flooding & Severe Repetitive Loss: Public Works, Fire & Office of Emergency Management
- Chesapeake Bay Preservation Area, Wetlands, Dunes, Open Space: Planning, Parks & Recreation, Various Boards & Commissions
- Water Quality Programs: Planning, Pubic Works, Fire, Clean Waters Task Force, Green Ribbon Committee
- Energy Programs: Joint Energy Committee, Mayor's Energy Advisory Committee
- Floodplains Management: Planning, Public Works, Fire & Office of Emergency Management, Housing & Neighborhood Preservation, Parks & Recreation, Communications & Information Technology, Media & Communications, Emergency Operations

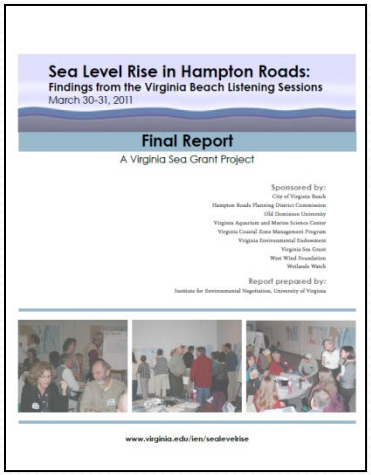
City of Virginia Beach

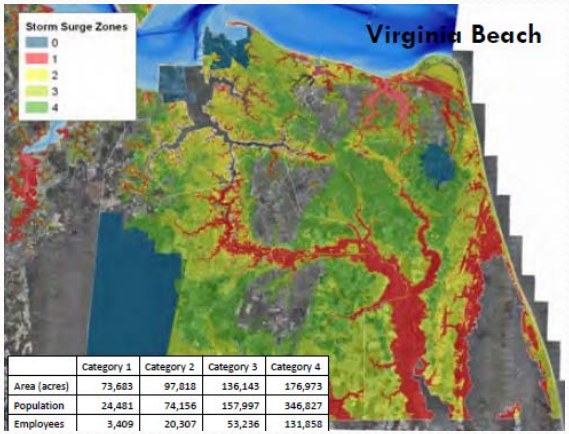
Reports, Studies, and Data



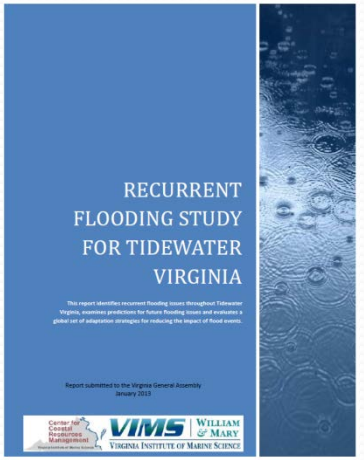








	Category 1	Category 2	Category 3	Category 4
Area (acres)	73,683	97,818	136,143	176,973
Population	24,481	74,156	157,997	346,827
Employees	3,409	20,307	53,236	131,858



City of Virginia Beach

Our Partners

Elizabeth River Project
Making restoration a reality.

Old Dominion University

VIMS | William & Mary
Virginia Institute of Marine Science

NOAA Sea Grant Virginia

LynnHaven River NOW
Restoring a legend.

RIF Rudee Inlet Foundation

NASA

Save the Bay · Save the Bay · Save the Bay

Chesapeake Bay Foundation
Saving a National Treasure

Wetlands Watch
wetlandswatch.org

Hampton Roads PDC
Planning District Commission

Back Bay Restoration Foundation

DEQ
Virginia Department of Environmental Quality

University of Virginia

City of Virginia Beach

City of Virginia Beach

Assistance from the Commonwealth

- Stronger leadership role in flood and sea level rise management
- Identify a champion agency to play coordination role and serve as resource for localities and federal government to partner in planning and implementation
- Take ownership of necessary integration role between localities and federal government
- Comprehensive and coordinated smart flood control planning
- Identification, collection and analysis of recurrent flooding events data
- Leadership in addressing access to federal funding and priorities for addressing adaptation strategies
- Study potential legal and policy barriers for localities and find equitable solutions

City of Virginia Beach

Benefits from a Leadership Role by the Commonwealth

- Economies of scale
- Bigger voice of advocacy
- Enhanced coordination with federal agencies: Homeland Security & FEMA, DOD & Corps of Engineers, HUD, NASA
- Enhanced ability to obtain federal support & funding
- Multiple objectives and benefits: hazard mitigation, emergency response, Chesapeake Bay preservation, TMDL reductions, economic development, redevelopment

City of Virginia Beach

City of Virginia Beach

Adaptive Planning for Flooding and Coastal Change in Virginia: Legal and Policy Issues for Local Government

Plenary Session, Friday, September 13, 2013, 9:30 – 10:30 a.m.

College of William & Mary, School of Education, Matoaka Woods Room
301 Monticello Avenue, Williamsburg

Other Mayors Presenting Remarks During Plenary:
Paul Fraim – Norfolk & Molly Ward - Hampton

Thank you for the invitation to come here today and join with some of my fellow Mayors in Hampton Roads to share with you how Virginia Beach is currently addressing flooding, storm surge and rising waters, and to tell you about the real challenges we face in doing so.

We welcome the opportunity to be a part of this important conversation with other Coastal Virginia localities, researchers at VIMS, and the legal minds here at the College to learn about our collective situations and needs, and decide how best we can partner in approaching our state legislators to ask for their assistance in helping us get the job done.

(Slide 1):

Virginia Beach is uniquely blessed with an abundance and variety of shoreline environments. These include the Oceanfront Resort and Sandbridge Beach, communities along Owls Creek, Rudee Inlet and the Atlantic Ocean, the tidal waters of the Chesapeake Bay and its tributaries along the Elizabeth and Lynnhaven River systems, and our tidal and wind-driven Southern Watersheds along Back Bay and the North Landing River.

(Slide 2):

Along these waterways, we have many fine residential neighborhoods and commercial centers, resort beaches, federal military assets, federal, state and local park lands, and a vibrant agricultural lifestyle—all of which bring real quality of life value to our residents, businesses, and visitors and contribute greatly to our local, state and federal economies.

We take protecting our citizens and visitors, our waterways, and our shoreline environments very seriously. We have a vast array of land use plans and policies, development regulations, and programs currently in place.

We are addressing hurricane protection, stormwater management and flooding needs through capital projects using local, state and federal resources, and through collaborative initiatives with our universities and community partners wherever we can. We are also learning from our neighbors in Coastal Virginia, other coastal states, our federal and state agency partners, and local watershed conservation organizations how we can do a better job.

(Slide 3):

Here's a snapshot of the various plans and policies we use. Our Beach Management Plan guides our strategies for beach replenishment. Our award-winning 2009 Comprehensive Plan contains an Environmental Stewardship element, acknowledging natural and man-made hazards attributable to —*and* which contribute to **global climate change**, **sea level rise**, and **coastal flooding and floodplain management** and what we should do about them through our long-range physical planning. It also contains a Southern Watersheds Management Plan.

Most recently, we have added to our Comprehensive Plan a suite of eight Strategic Growth Area Master Plans, which address future land use, infrastructure, stormwater management, water quality improvement, and open space needs as we re-shape and grow these areas over time. We partnered with the Hampton Roads Planning District Commission in 2011 to update the South Hampton Roads Regional Hazard Mitigation Plan.

The Quality Physical Environment element of our City's Strategic Plan now contains an initiative to address Recurrent Flooding. And in 2013, we adopted "A Community Plan for a Sustainable Future" — our vision for a triple-bottom line of **economic**, **social and environmental sustainability**. Together, these plans and policies provide us with a comprehensive blueprint for action and provide a basis for guiding our daily operations to protect our citizens and our shoreline environments.

(Slide 4):

To implement our plans and policies, we apply a variety of development regulations in the form of local ordinances to both private and public sector development activity. These include: floodplain regulations in our Site Plan Ordinance, which we are in the process of updating to create a stand-alone Floodplain Ordinance in accordance with FEMA standards, and ordinances that address Chesapeake Bay Preservation, wetlands, coastal primary sand dunes, erosion and sediment control, stormwater management, and Southern Watersheds management.

(Slide 5):

We use an interdisciplinary and team approach on City staff, and work closely with our citizens through City Council appointed advisory committees and task forces. To give you some examples…

- Beach nourishment and management are jointly administered by the Departments of Public Works and Parks and Recreation.

- Coastal flooding and stormwater management are jointly administered by the Departments of Public Works and Planning.

- Our Recurrent Flooding and Severe Repetitive Loss Program is administered by our Office of Emergency Management in the Fire Department, with assistance from Public Works.

- Our Chesapeake Bay Preservation Area, Beach Management, Wetlands and Open Space Programs are administered by several City departments and Council-appointed Boards and Advisory Committees.

Some years ago, the Virginia Beach City Manager established the Clean Waters Task Force, and our City Council established the Green Ribbon Committee to address water quality matters. In recent years, we have turned our attention to creating an Energy Program and Joint Energy Committee to reduce the City's carbon footprint by setting goals for reducing municipal energy consumption.

We are also exploring options for alternative energy development through the newly formed Mayor's Energy Advisory Committee.

Just this year, an interdepartmental Floodplains Management Group was formed, consisting of the Departments of Planning, Public Works, Fire's Office of Emergency Management, and the Departments of Housing and Neighborhood Preservation, Parks & Recreation, Communications and Information Technology, Media and Communications, and our 311 Coordinators… to better understand how various departments respectively address the challenges of flooding and floodplains management and **to develop a more comprehensive and coordinated approach to floodplain management**.

(Slide 6):

To inform and assist with our policy making and implementation strategies, we are relying on a variety of data, computer modeling, state and federal grants, and university research. We are pleased to have new and more accurate Flood Rate Insurance Maps from FEMA, and regional LIDAR mapping from HRPDC. Our Center for GIS is using contour and elevation mapping and modeling to analyze coastal inundation impacts to our municipal infrastructure.

We are benefitting from greater public awareness raised by the Commonwealth's Recurrent Flooding Study prepared by VIMS, the HRPDC's Climate Change Studies, ODU and SeaGrant forums, and from academic student research by UVA through its Institute for Environmental Negotiation.

We are currently administering — with a whole lot of frustration, I might add — a **$1.7 million dollar** federal grant from FEMA to elevate nine structures under the Severe Repetitive Loss Program in our Lynnhaven Colony neighborhood. Our Deputy City Manager Dave Hansen will be further addressing this and related issues during his presentation this afternoon at 3:45.

Through our Capital Improvement Program, we have funded hurricane protection and stormwater management projects along the Boardwalk and Atlantic Avenue at the Oceanfront and in the Shore Drive Corridor along the Chesapeake Bay. Under an agreement with the U.S. Army Corps of Engineers, we maintain an engineered flood channel to help eliminate flooding in upstream neighborhoods.

(Slide 7):

Our various partnerships are important because the City, in no way, can get the job done alone. At the local level, we rely heavily on the grassroots support, expertise and energy of various watershed protection organizations such as **Lynnhaven River Now**, the **Elizabeth River Project**, the **Chesapeake Bay Foundation**, the **Back Bay Restoration Foundation**, and our **citizen advisory committees**.

Our key regional partner is the HRPDC, which assists us with research, planning and grants. Our state and federal agency partners are critical to providing us with the technical resources and training we need, as well as financial resources to tackle our challenges. Our local and state universities help us in a special way with research, modeling, mapping, planning, and public outreach.

So, it's very clear that we embrace our natural resources and unique coastal environment, yet also understand the challenges that come with living in such a beautiful and vulnerable area. It's also clear that we have a relatively sophisticated approach, reflected in our planning, policies, regulations and programs administration, our professional staff capacity and resource allocation, and our many partnerships. Yet, despite all of this, we are not as well prepared as we need to be to address the full scope of projected realities in the Year 2100, and we can **and must** make continued improvements.

(Slide 8):

A lot of people are working hard together to do the right things. But, it can be difficult to navigate through it all. We must raise awareness through better communication — within City government, among our citizens, and with the various state, federal and community partners with whom we work —about the various plans and strategies we have in place, and what we're doing with them to protect our land and our people.

We can seek greater alignment of the tools in our toolkit to make sure we're maximizing efficiencies and not working at cross purposes. We will benefit from continued cross-disciplinary, interdepartmental dialogue among our professional staff and taking collective ownership for the challenges we face.

Since Norfolk has established a high-level coordination process that has been working together for a few years now... and Hampton has developed a highly effective public outreach and communication process on sea level rise issues… we can invite them both to sit with us and share their lessons-learned and successes.

In dialogue with our citizens, we can use the opportunity we have, beginning next year, with the next update of our Comprehensive Plan to dig deeper and explore the pros and cons of all the enabling authorities that have been granted to localities by the Commonwealth… to establish holistic policies and strategies that address the full spectrum of coastal adaption techniques applicable to our city.

We must be willing to consider all of our options, including:

- Avoidance of new development and redevelopment and planned, strategic retreat in those areas of our city where historic storm events, accurate mapping, and sound modeling to show us we are most vulnerable; and,

- Reinforcement or elevation in place where it makes sense.

We can strengthen our design standards for development and stormwater management… to reduce the harmful effects of stormwater runoff, yet still remain economically viable.

We can continue to press for multi-modal transportation choices for our citizens to reduce our dependence on automobiles, which contribute to greenhouse gases and a

warming planet… which in turn contributes to rising waters and more intense storms.

We can gain a better understanding of the potential legal challenges we face in implementing our strategies, and what additional local government enabling authorities might be needed to overcome these challenges. *This* conference is **the perfect start**!

We can learn about innovative measures being used in other Coastal Virginia localities and coastal states, and seek to apply them as appropriate to our context.

We can build on our strong relationship with the Department of Defense to protect our military installations and their missions, and to jointly manage our respective shorelines for the benefit of our whole community.

And we can identify additional partners.

We are willing to do these things to not only be a leader in Hampton Roads in planning for coastal resiliency, but also to be a model coastal city.

But, we could also become easily overwhelmed by the magnitude of the challenge if we don't approach it properly — and together with the Commonwealth — in the relatively short window of opportunity we have over the next 20 to 30 years, to carefully yet quickly plan for adaptation, and take the incremental measures necessary in order to be in the best position to live with higher waters come the Year 2100.

As individual localities, we simply do not have sufficient technical resources to define and address:

- Coastal flooding risks;
- A coordinated framework and structure with our regional, state and federal partners to respond and plan for the future in the most comprehensive way possible; and
- The financial resources to implement the solutions that will be needed.

(Slide 9)

Therefore, we join our voices with other Coastal Virginia localities in asking the Commonwealth to increase its assistance to us in the following ways:

(1) Recognize the risks of doing nothing, and step up and take a stronger leadership role to include flood and sea level rise management into the Commonwealth's purview.

(2) Identify a champion department or agency to play a coordination role and to be a resource for both localities and the federal government to partner with in planning and implementation.

(3) Take ownership of the necessary integration role between the localities and the various federal agencies, so we don't find ourselves at odds with one another and wasting precious time and resources while trying to help our citizens.

(4) Immediately begin comprehensive and coordinated smart flood control planning.

(5) Initiate identification, collection and analysis required to respond to recurrent flooding events.

(6) Take a lead role in addressing issues of access to federal funding and priorities that are consistent in addressing the various adaptation strategies.

And (7) Study the potential legal and policy barriers that can constrain us from doing the best job we can to protect our land, our people and our economy from flooding and flood risk and find equitable ways to break through them.

(Slide 10)

The benefits of the Commonwealth taking a leadership role are:

- Economies of scale;
- A bigger voice of advocacy;
- Enhanced coordination with federal agencies—such as the Department of Homeland Security and FEMA, the U.S. Army Corps of Engineers, HUD, and DOD, including the military installations in Coastal Virginia;

- The enhanced ability to obtain federal support and funding; and, realizing the synergies of multiple objectives, including hazard mitigation, emergency response, Chesapeake Bay preservation, reduction of TMDLs, and economic development and redevelopment.

The time to act is <u>now</u>!

I look forward to working with the Mayors and Chairs in the Hampton Roads region through the Hampton Roads Planning District Commission to seek this assistance from the Commonwealth through our regional legislative agenda. Mayor Fraim, Mayor Ward and I were successful in working together earlier this year, and going to Richmond to help bring additional transportation funding to Hampton Roads to keep Virginians <u>and our economy</u> moving upward.

Without doubt — with your help —we can be successful again.

We cannot afford to do nothing.

The safety and welfare of:

- Our citizens and their property;
- Our local, state and federal infrastructure, parkland, and military assets; and
- Our combined economic value to the Commonwealth

are too great.

Thank you.

Recurrent Flooding Study for Tidewater Virginia

Recurring Coastal Flooding Subpanel of the Secure Commonwealth Panel

Sept 25, 2013

Richmond, VA

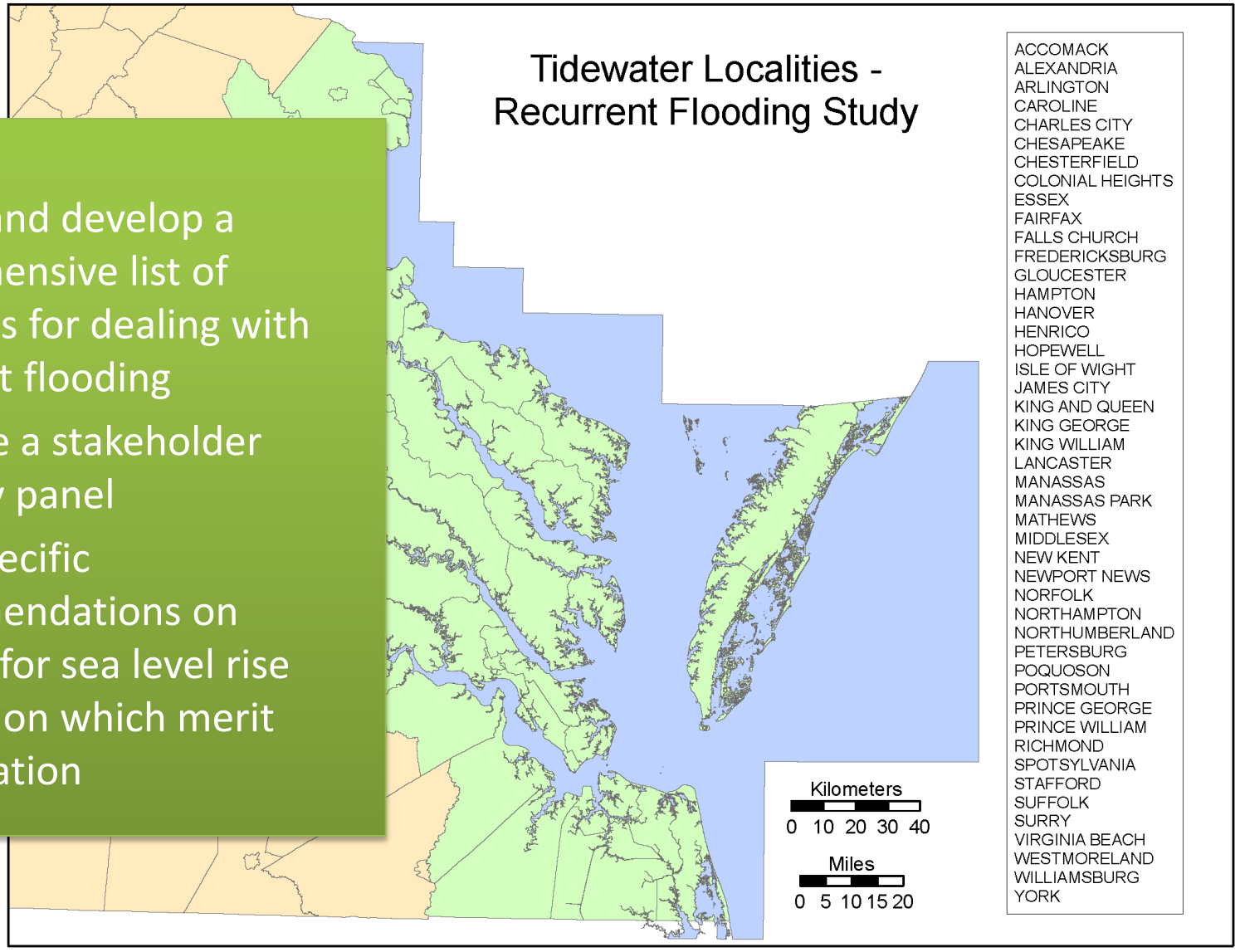
Molly Mitchell

Center for Coastal Resources Management
Virginia Institute of Marine Science

VIMS | William & Mary
Virginia Institute of Marine Science

Recurrent Flooding Study

- Goals
  - Review and develop a comprehensive list of strategies for dealing with recurrent flooding
  - Convene a stakeholder advisory panel
  - Offer specific recommendations on options for sea level rise adaptation which merit investigation



Collaborators: VIMS, ODU, HRPDC, City of Norfolk, A-NPDC, Wetland Watch

Causes of Flooding

- Precipitation based flooding
  - Issue throughout Virginia
- Tidal and storm surge flooding
  - Issue in tidal areas


Photo by Liz Roll/FEMA


Flooding in Franklin, VA
Photographer: Liz Roll/FEMA

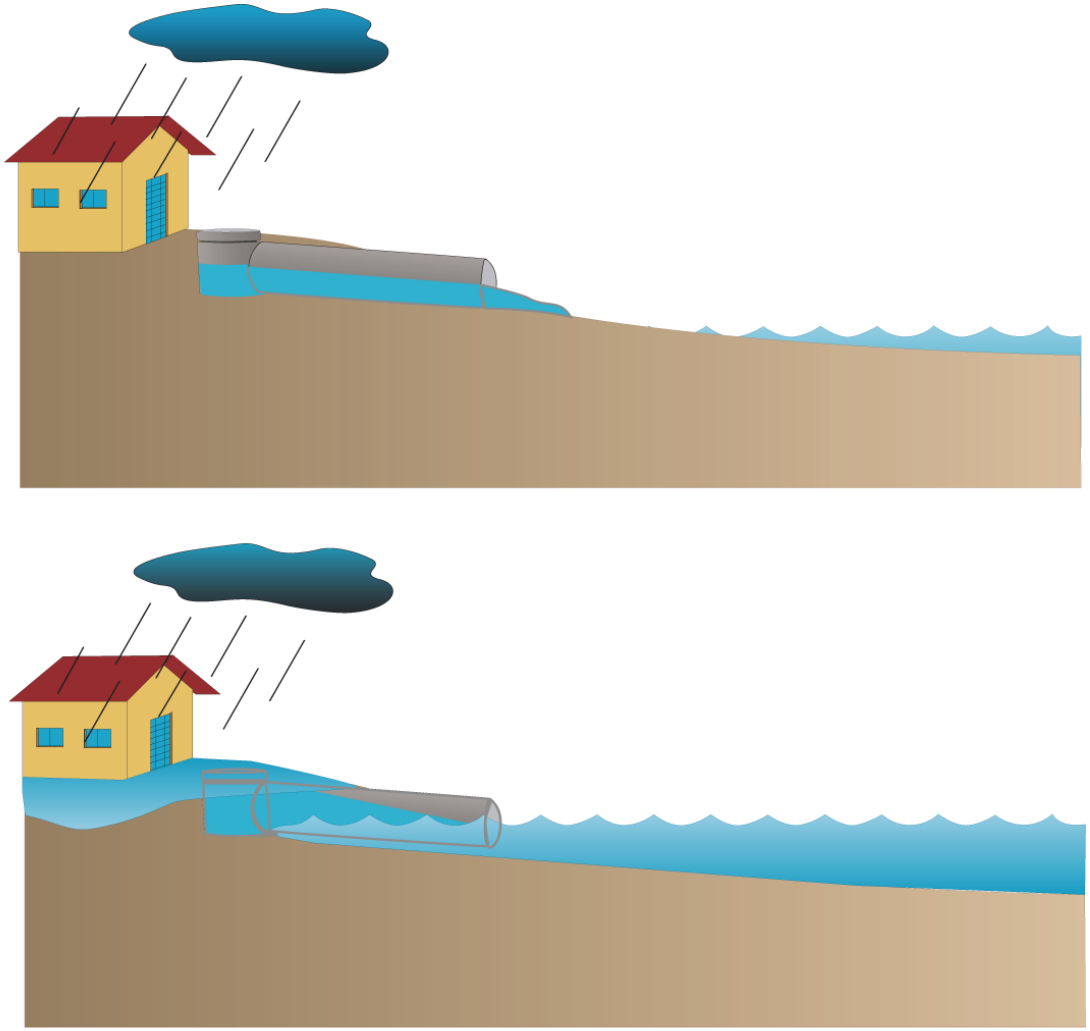
Precipitation-driven flooding is influenced by…

- **Rainfall** (amount and rate)
- **Topography**
  - water runs faster off steep ground and roofs)
- **Type of Soil**
  - how permeable
  - how saturated
- **Developed** and impervious land (roads and roofs)
- **Vegetation**
  - Marsh
  - Forest
- **Size of watershed**

Tidal and Storm surge flooding is influenced by…

- **Tidal cycles**
- **Elevation**
- **Storm Characteristics (pressure systems)**
- **Natural shoreline**
  - Marsh
  - Beach
- **Shoreline stability (erosion potential)**
- **Local and global water levels**

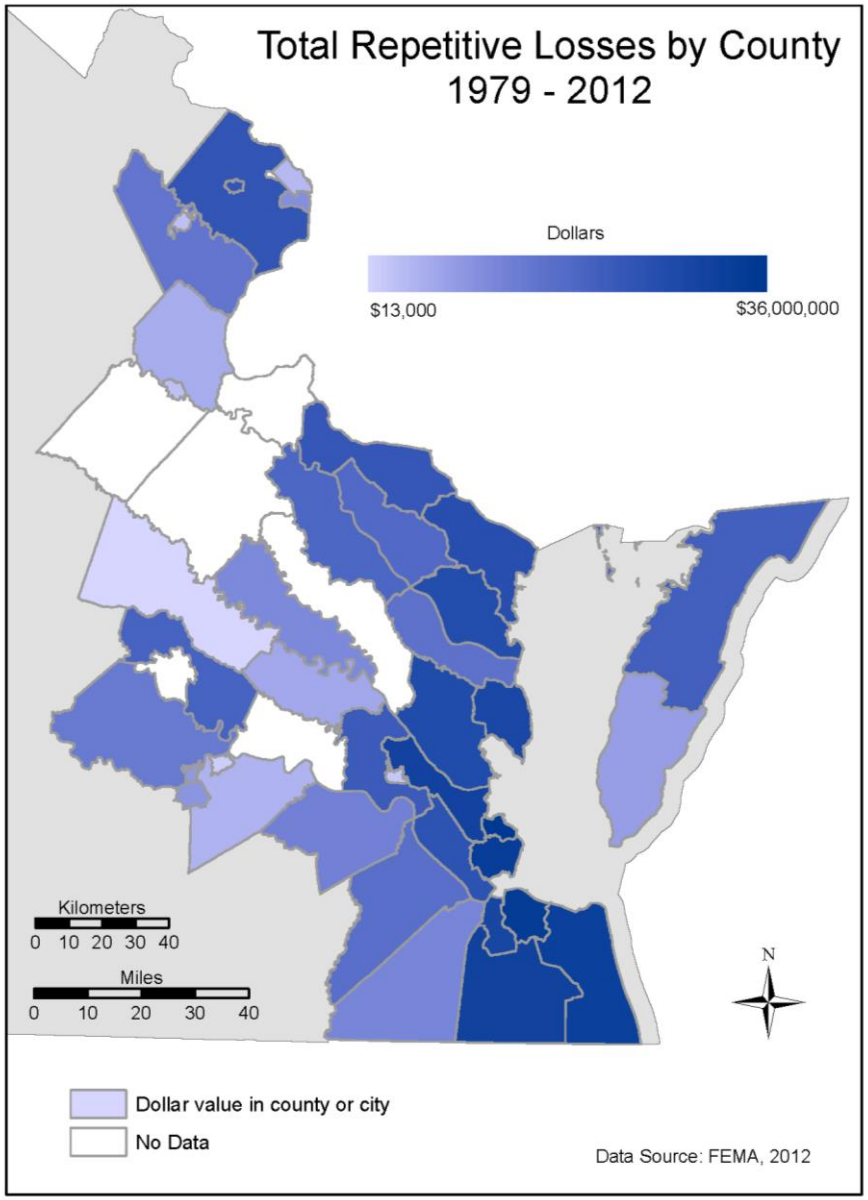
Storm & tidal interaction

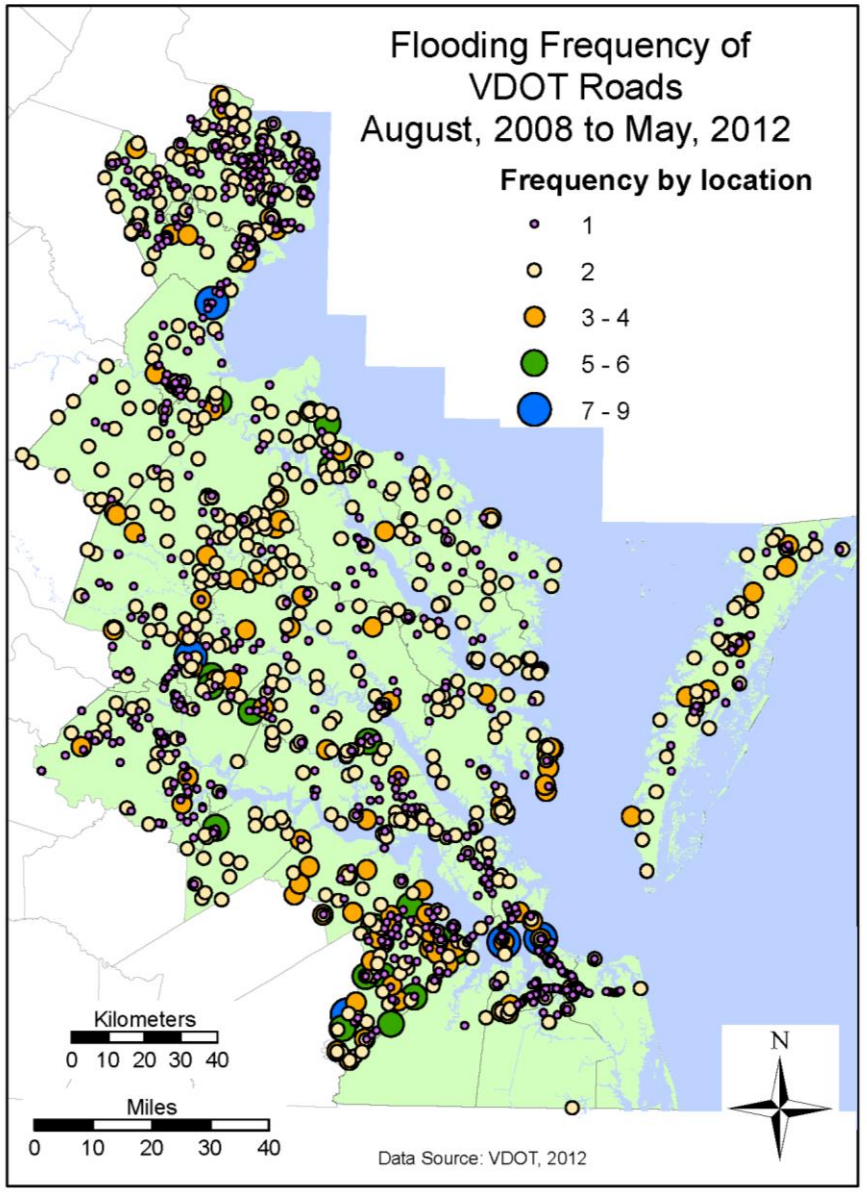


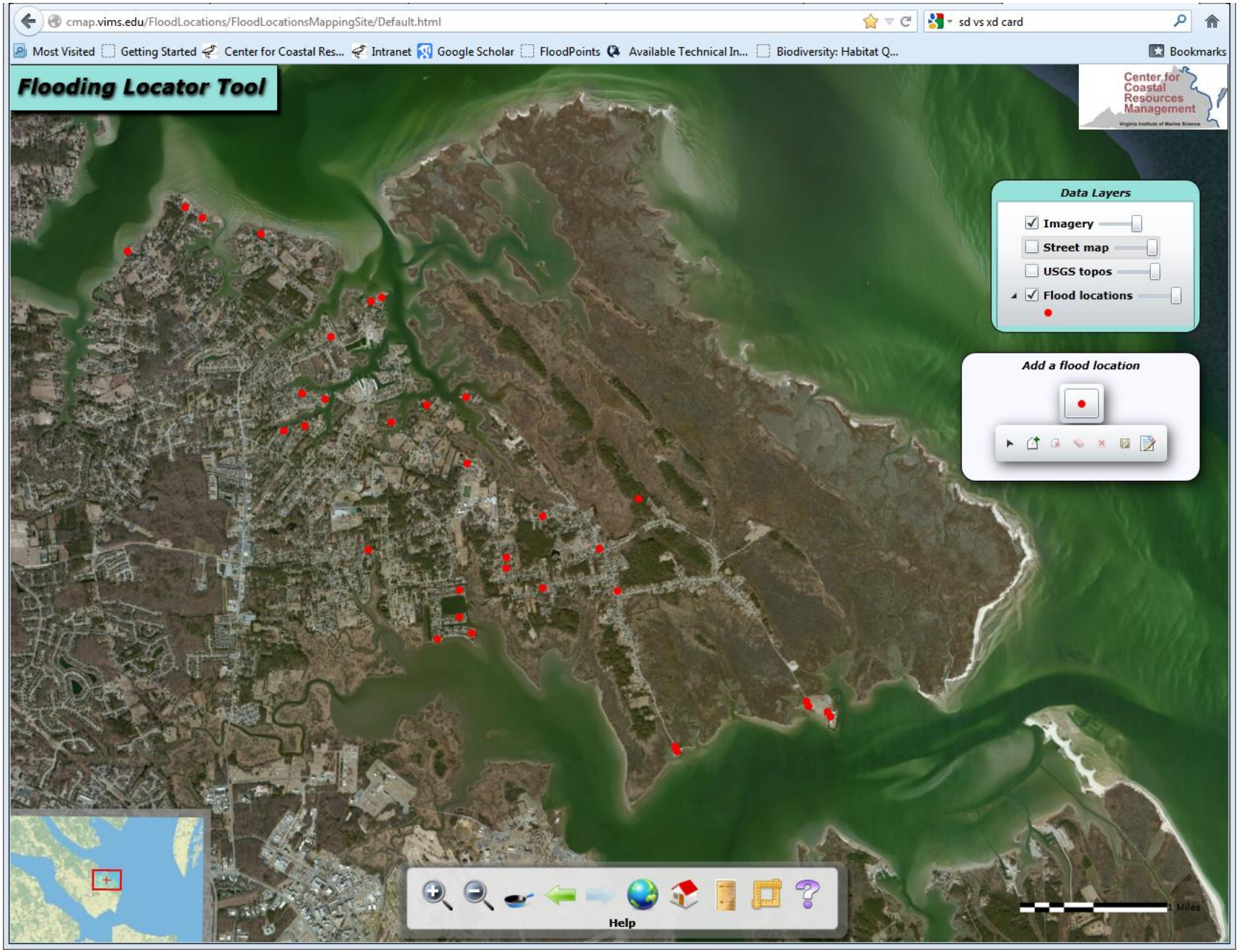
Symbols from Integration and Application Network, University of Maryland Center for Environmental Science (ian.umces.edu/imagelibrary/)

Stormwater drainage outfalls at low elevation may be flooded during high tides or storm surges.

This prevents the pipes from draining, stormwater backs up and flooding occurs.

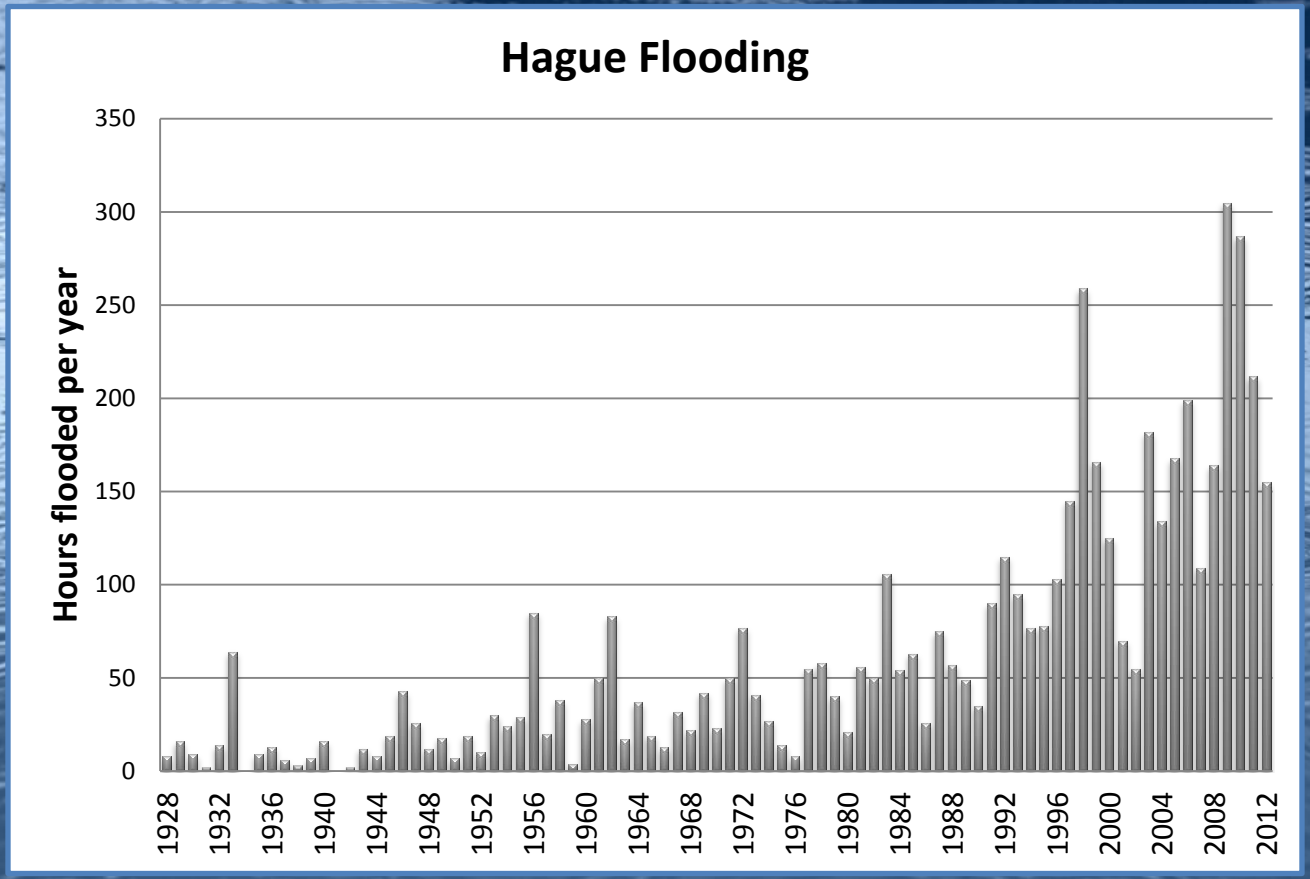

Total Repetitive Losses by County
1979 - 2012
Dollars
$13,000
$36,000,000
Kilometers
0 10 20 30 40
Miles
0 10 20 30 40
N
Dollar value in county or city
No Data
Data Source: FEMA, 2012


Flooding Frequency of
VDOT Roads
August, 2008 to May, 2012
Frequency by location
1
2
3 - 4
5 - 6
7 - 9
Kilometers
0 10 20 30 40
Miles
0 10 20 30 40
N
Data Source: VDOT, 2012


cmap.vims.edu/FloodLocations/FloodLocationsMappingSite/Default.html
sd vs xd card
Most Visited
Getting Started
Center for Coastal Res...
Intranet
Google Scholar
FloodPoints
Available Technical In...
Biodiversity: Habitat Q...
Bookmarks
Flooding Locator Tool
Center for Coastal Resources Management
Virginia Institute of Marine Science
Data Layers
Imagery
Street map
USGS topos
Flood locations
Add a flood location
Help
Miles

Tidal and Storm surge flooding

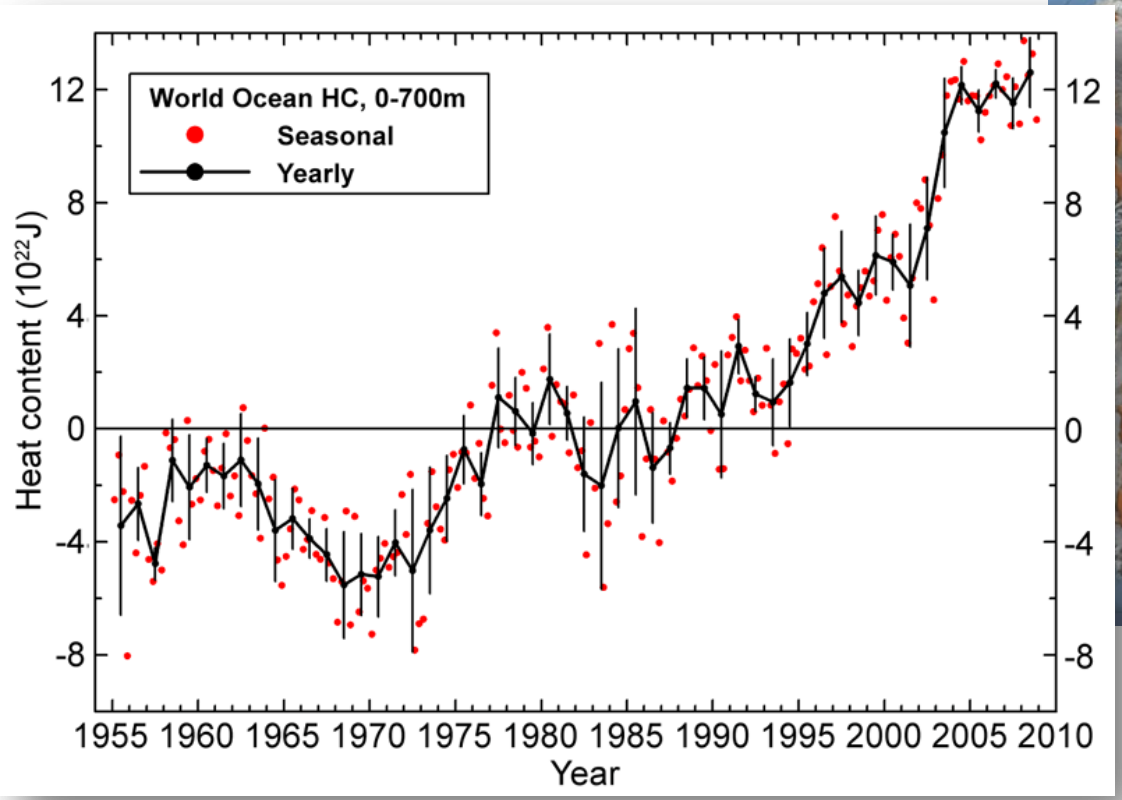
PREDICTING CHANGE



Data courtesy of Dr. Larry Atkinson, CCSLRI, Old Dominion University

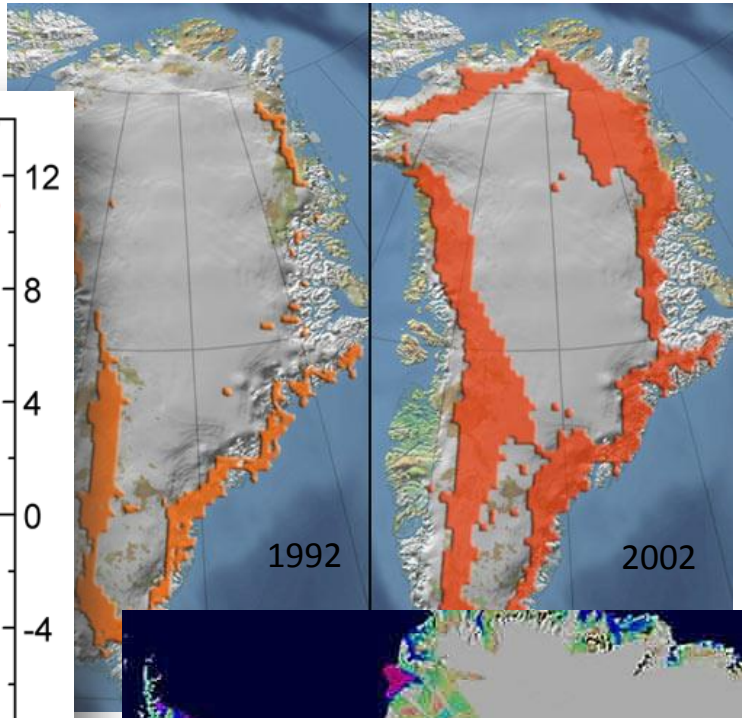
Global processes

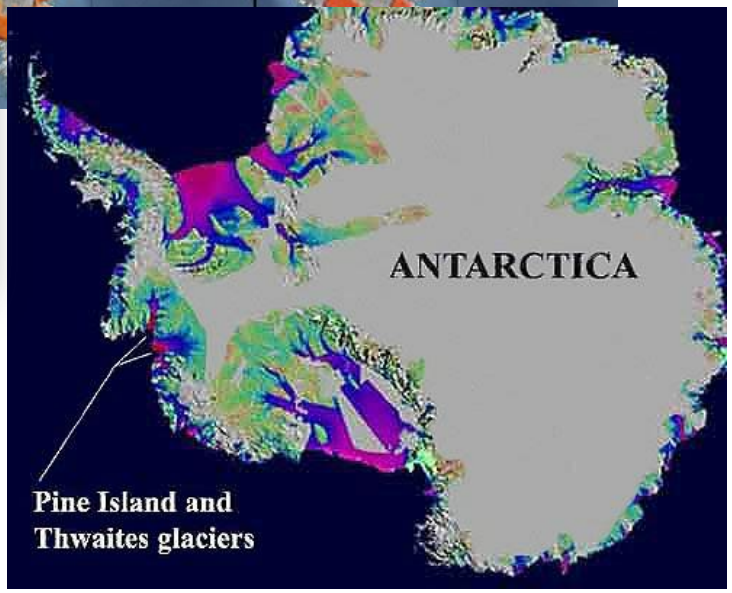
World ocean heat content - top 700 meters



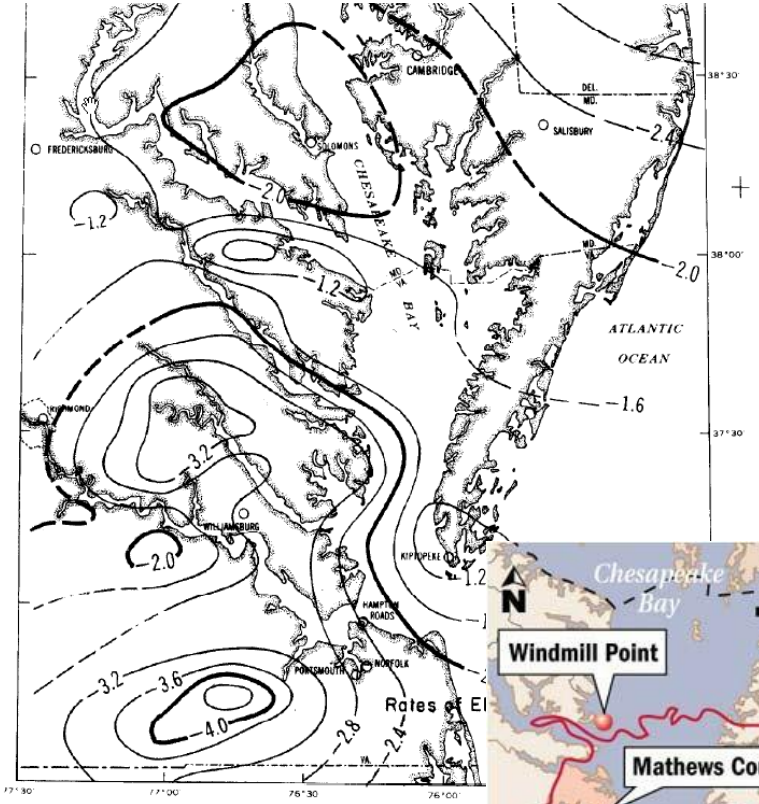
http://www.ncdc.noaa.gov/indicators/

seasonal ice melting

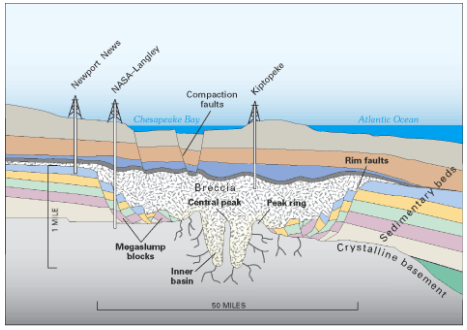


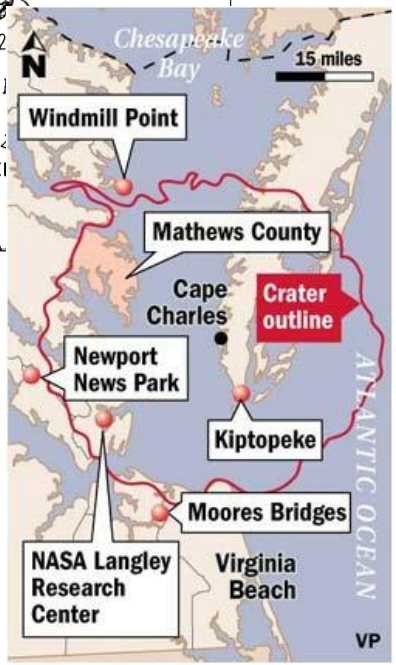


Local processes

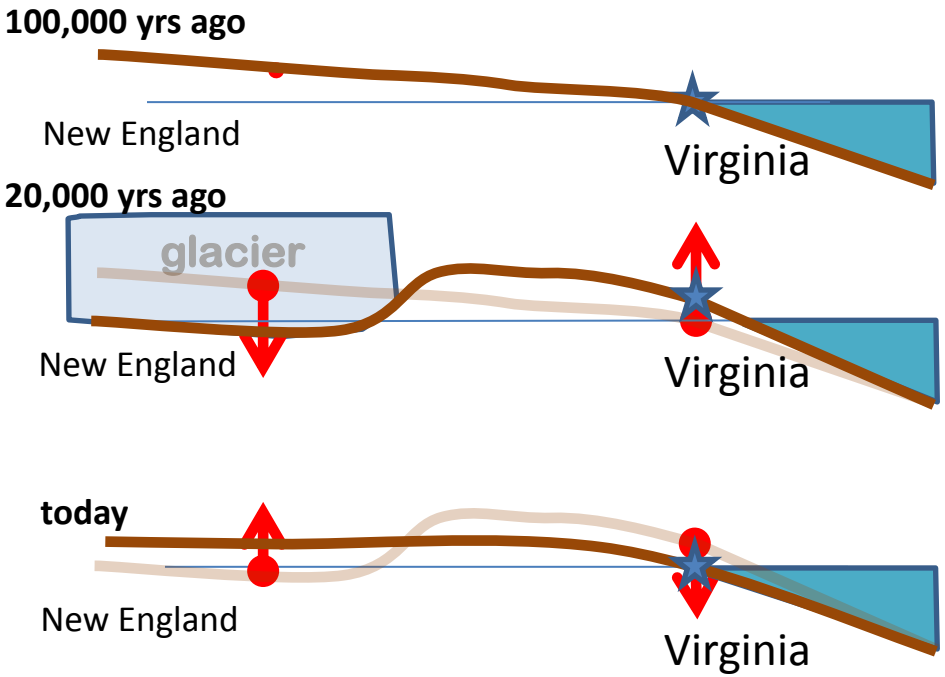


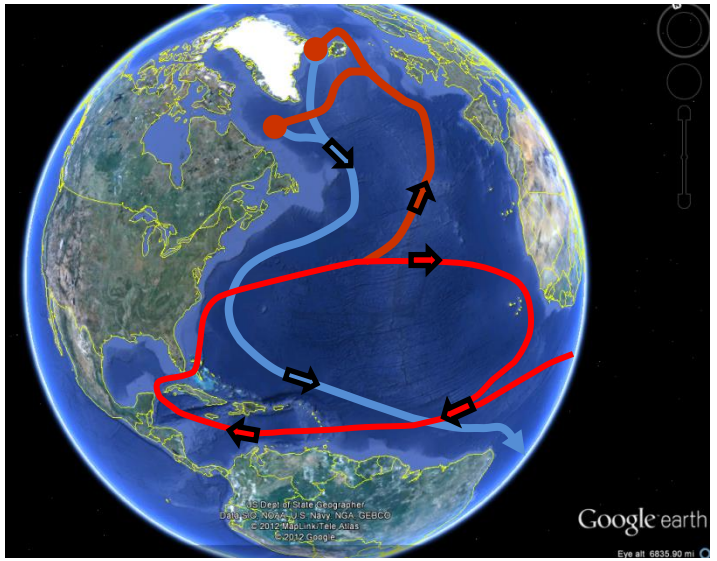
Holdahl and Morrison, 1974

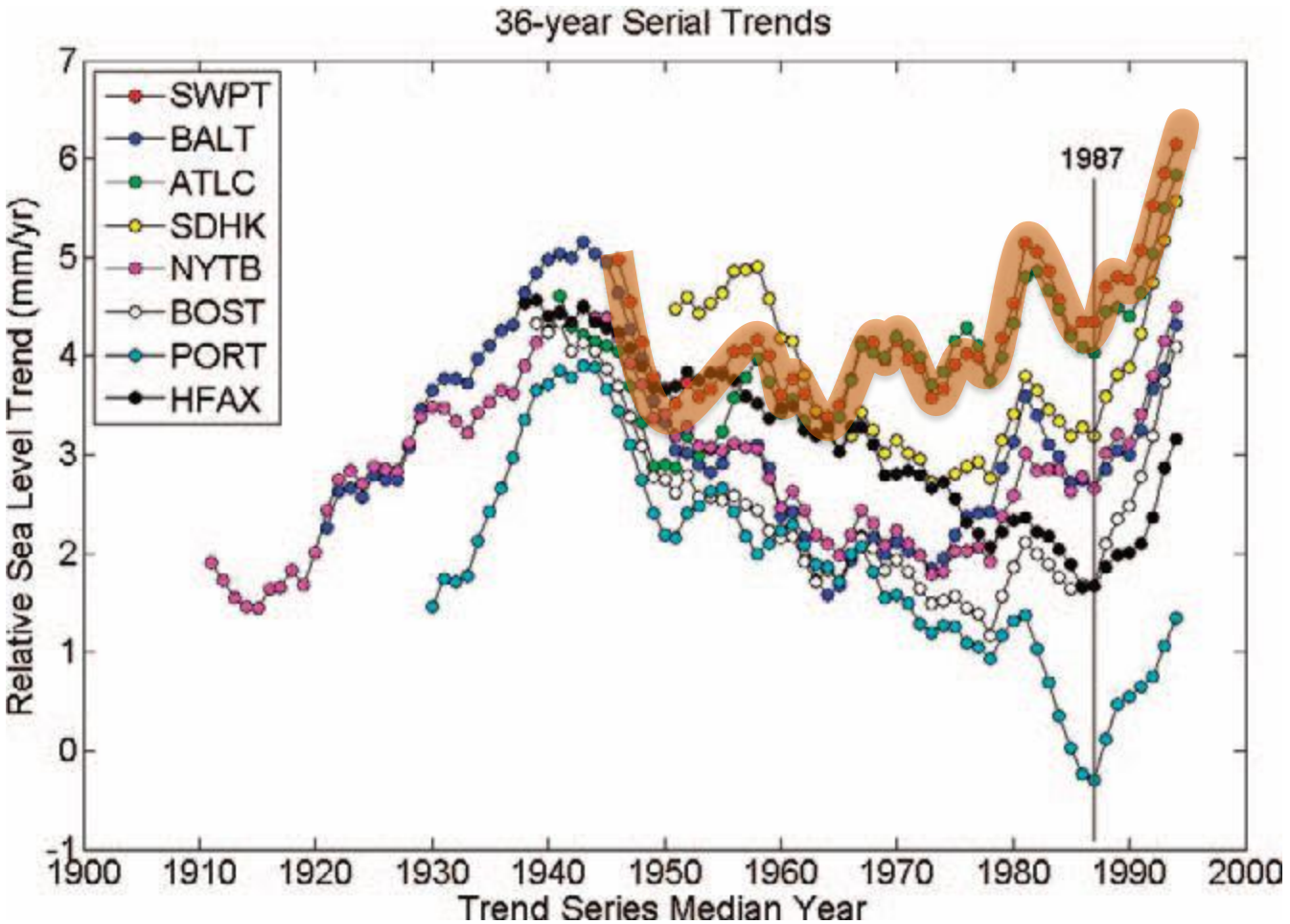




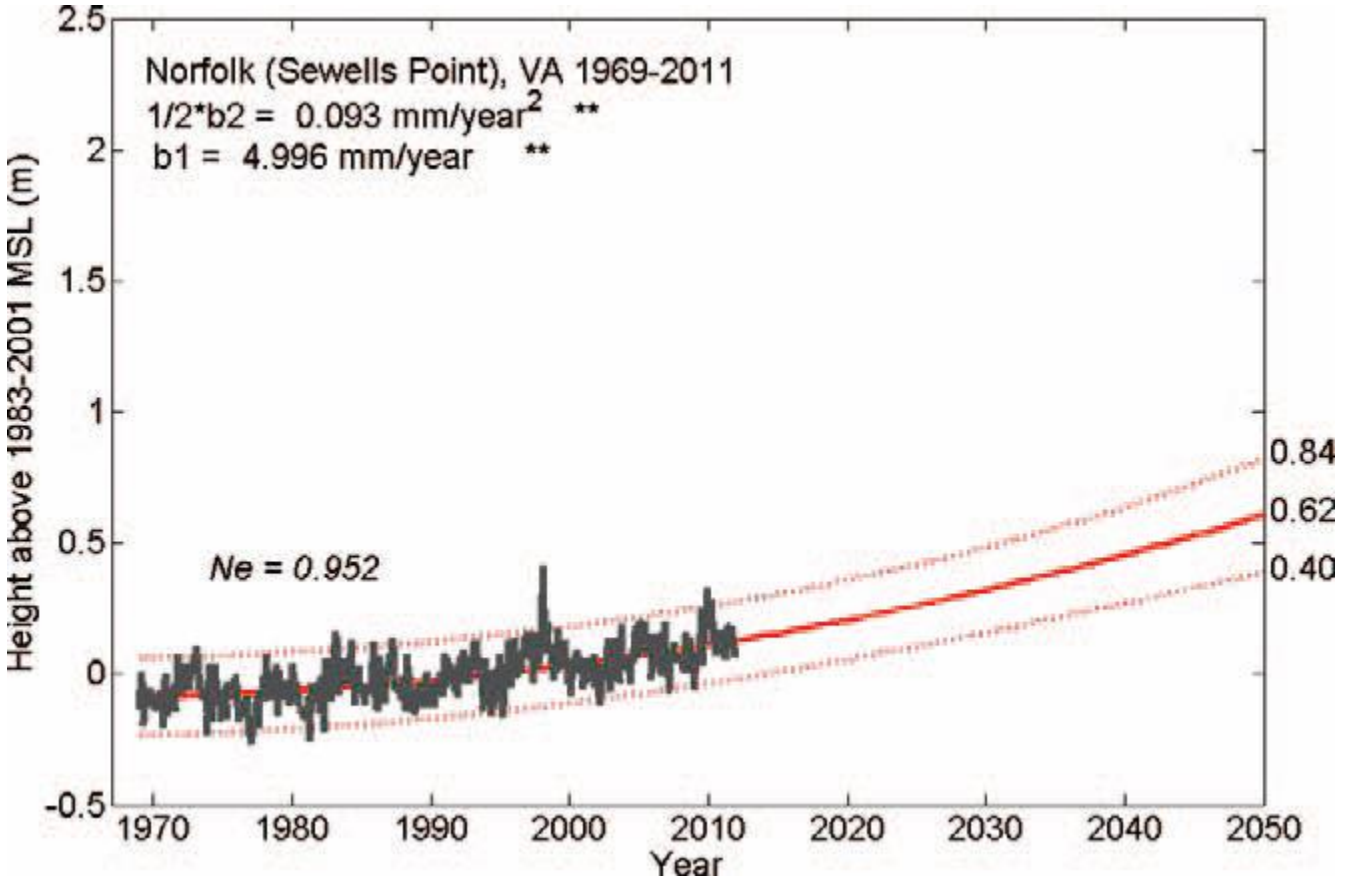
isostatic glacial rebound





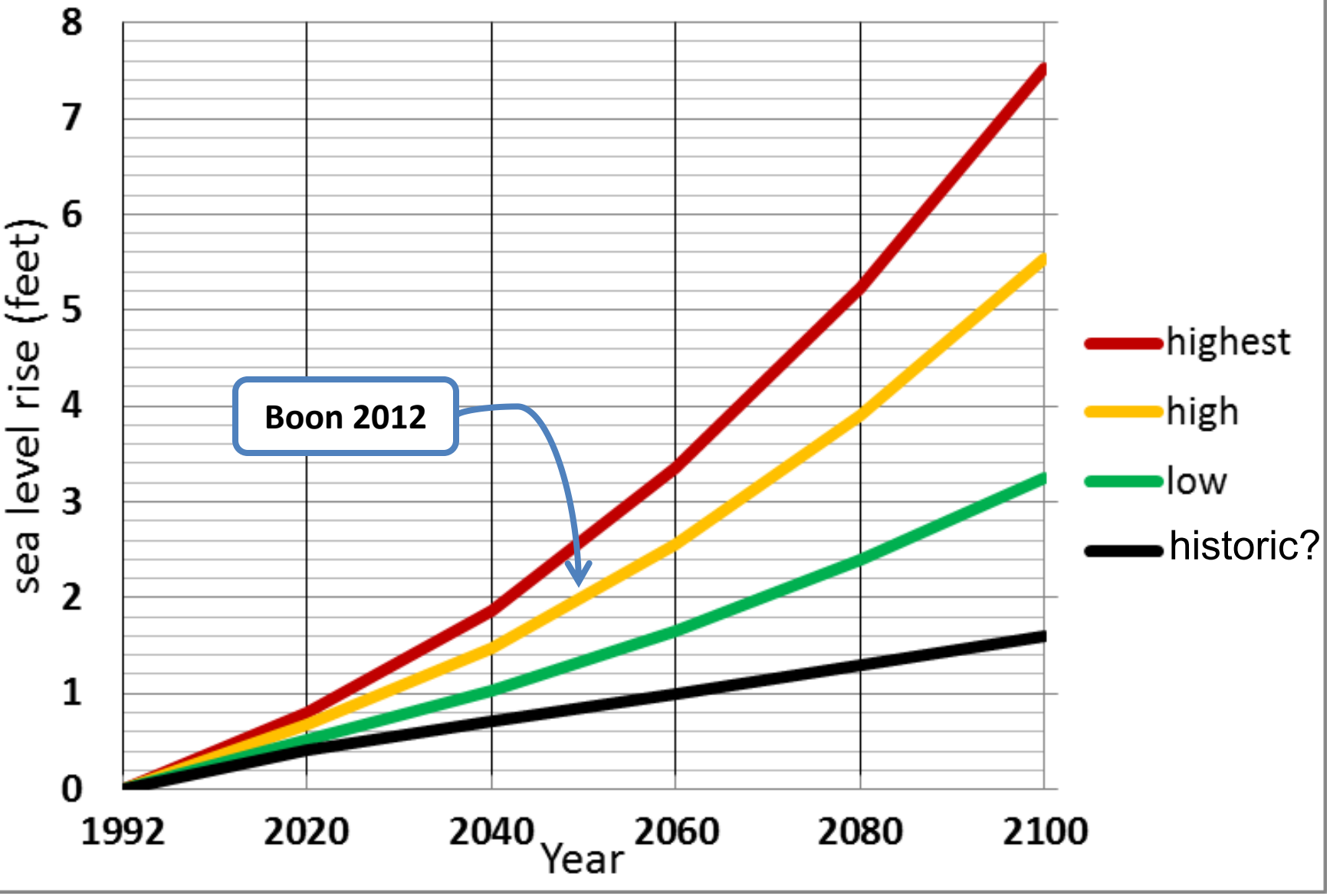


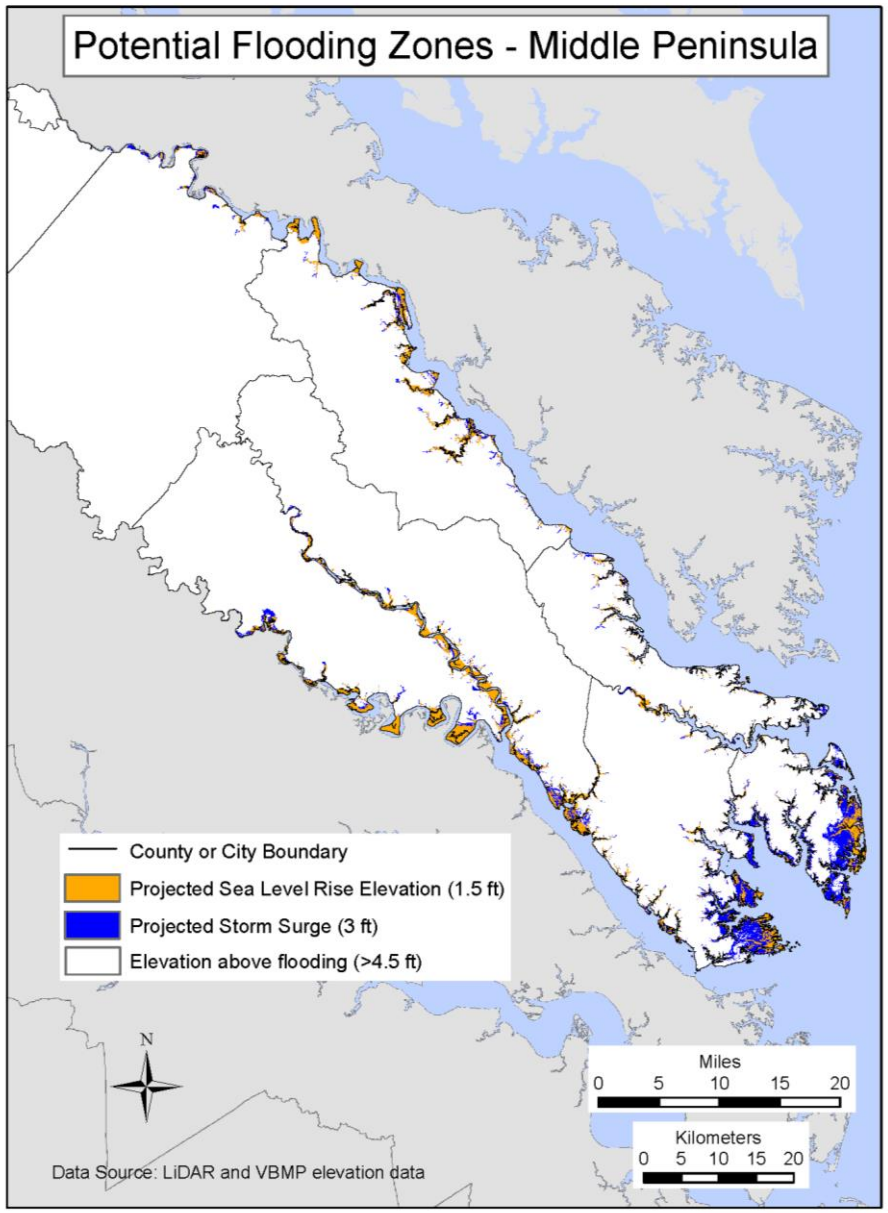
Boon, John D. "Evidence of sea level acceleration at US and Canadian tide stations, Atlantic Coast, North America." *Journal of Coastal Research* 28.6 (2012): 1437-1445.



Boon, John D. "Evidence of sea level acceleration at US and Canadian tide stations, Atlantic Coast, North America." *Journal of Coastal Research* 28.6 (2012): 1437-1445.

SE Virginia sea level rise scenarios





Locality	Vulnerable land (sq. mi)	Locality	Vulnerable land (sq. mi)
Accomack	208	Poquoson	11
Northampton	186	York	9
Virginia Beach	60	Newport News	8
Chesapeake	25	Hampton	8
Gloucester	24	Portsmouth	5
Mathews	17	Norfolk	4
James City	14	Others (collective)	53
King William	14		

FINDINGS

- Recurrent flooding is a significant issue in Virginia coastal localities and one that is predicted to become worse over reasonable planning horizons (20-50 years).

- The risks associated with recurrent flooding are not the same throughout all areas of Tidewater Virginia.

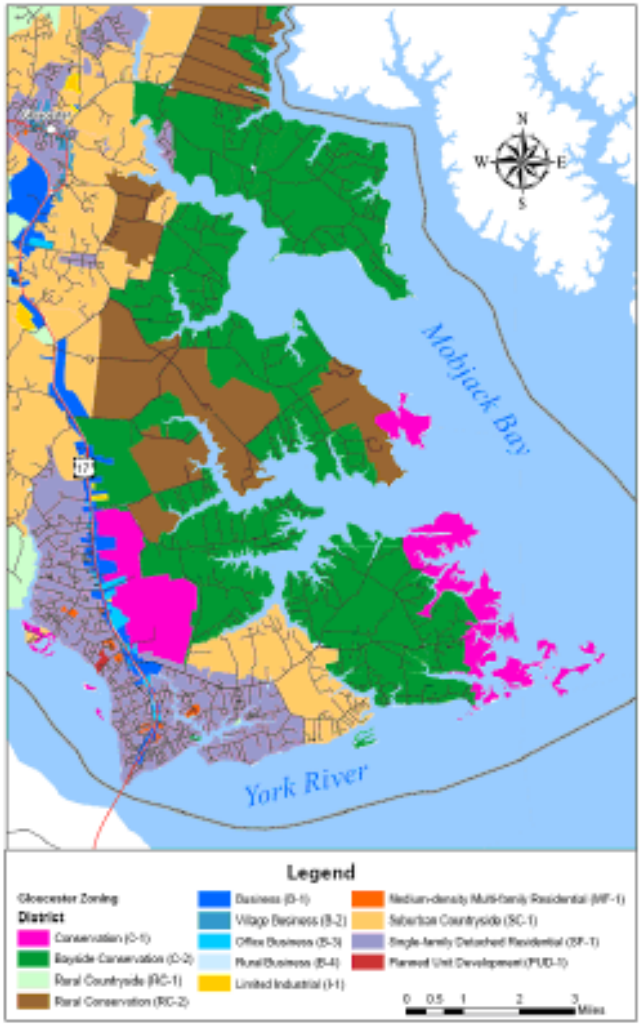
- Data are often lacking for comprehensive and/or fine resolution analysis of flood risks in the region.

Recommendation

The State should initiate identification, collection and analysis of data needed to support effective planning for response to recurrent flooding issues in Virginia.

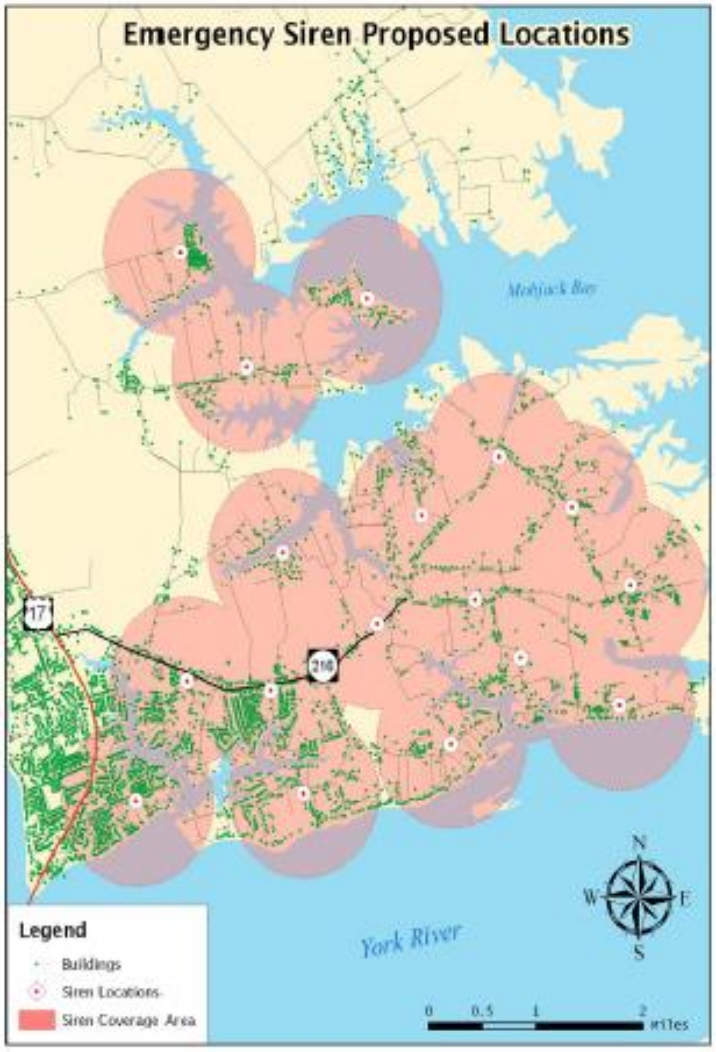
Management

Gloucester County Zoning (Southeastern Portion Inset)

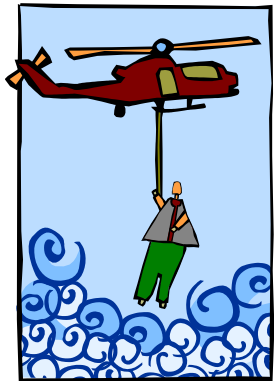


Source: County Base GIS layers were provided by United States Census Bureau and the County Zoning GIS layers were provided by Gloucester County Information Technology/ GIS Department.

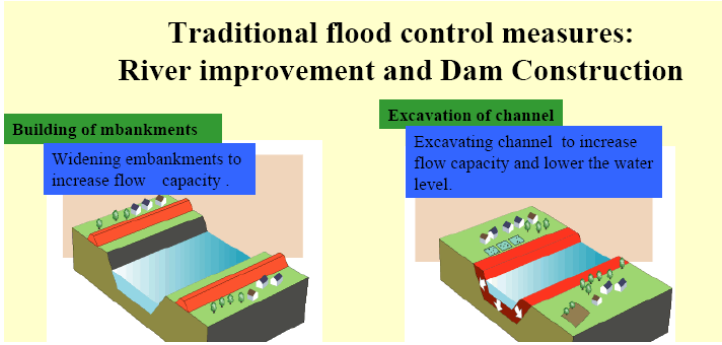
Accommodation



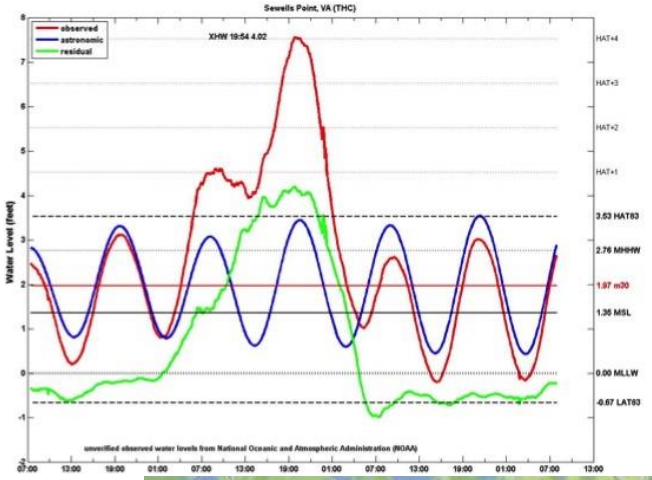
Source: County Base GIS layers were provided by United States Census Bureau and the County Addressed Building GIS layer was provided by Gloucester County Information Technology/ GIS Department.



Elevated house in Mississippi
Photo by Robert Harris/*FEMA*



Tidewatch – Early warning



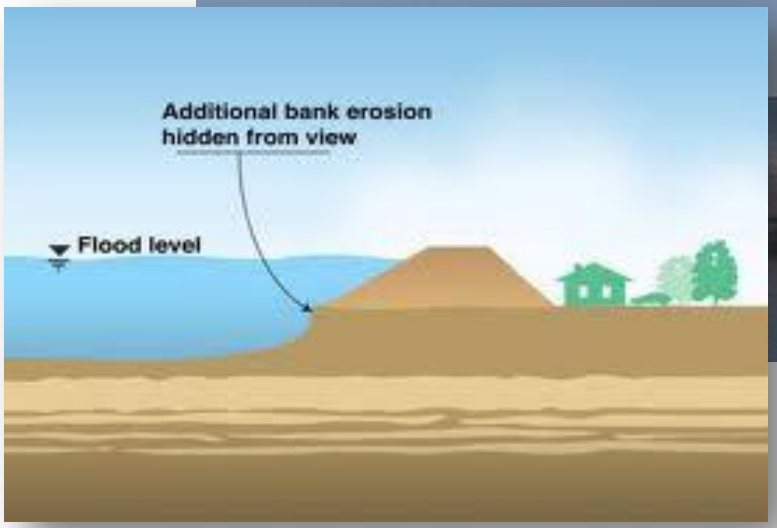
- On-line tool for gauging the <u>magnitude</u> of coastal flooding in a given location and minimizing its potential impacts

- The Tidewatch system now generates 36-hour public forecasts for 9 water-level stations within Chesapeake Bay and a single station on Virginia's seaside Eastern Shore.

VIMS Eastern Shore Seawater Lab

FEMA Zone VE (Coastal High Hazard)

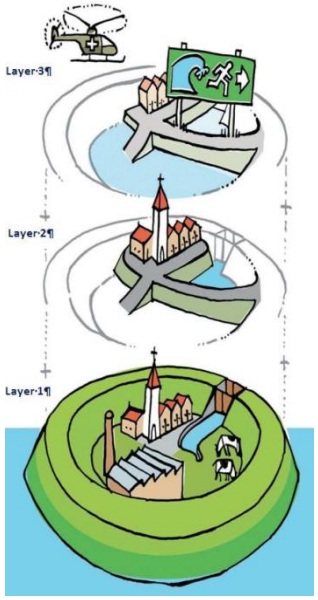
Protection



Created marsh in Virginia
Photo by K. Durhing

Multilayered Flood Protection & Flexible Adaptation

Neatherlands, National Water Plan, 2010



- Layer 3 = Disaster Management
- Layer 2 = Spatial Development
- Layer 1 = Prevention

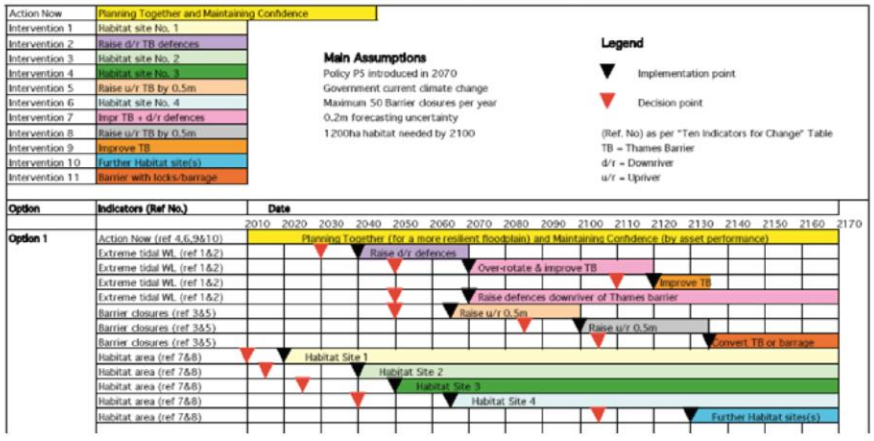
Adaptable because:

- Timing can be changed
- Can switch between options
- Structures designed to be upgraded
- Land planning includes potential future uses
- Considers new infrastructure planning

Chapter 5: The Thames Estuary 2100 Plan

Monitor 10 indicators: MSL, peak surge tide level, conditions of flood defense structures, developed area, intertidal habitat, etc.

Table 5.3 TE2100 Plan Options 1 and 3 compared through the century



FINDINGS

- Review of global flood and sea level rise management strategies suggests that it is possible for Virginia to have an effective response to increasing flood issues BUT it takes time (20-30 years) to effectively plan and implement many of the adaptation strategies.

- The optimal strategy is development of flexible adaptation plans

Requirements: serious planning, commitment of resources, and careful analysis of evolving conditions.

Benefits: reduces unnecessary expenses, ensures development decisions are informed, and recognizes the long lead times required for effective implementation of many adaptation options.

Recommendation

Given the long time frame necessary to effectively address recurrent flooding and sea level rise issues and given the speed at which risks are projected to increase, Virginia and its coastal localities should immediately begin comprehensive and coordinated planning efforts.

The State should develop a comprehensive strategy for addressing recurrent flooding issues throughout Tidewater Virginia, including prioritization of areas for flood management actions.

Stakeholder Advisory Panel

- 25 individuals selected to provide a broad representation of the Virginia coastal localities and agencies
- The panel focused on the roles of the state and localities in addressing flooding and sea level rise issues

Advisory panel outcomes/recommendations:

- Perception that Virginia localities are not adequately empowered to address the issues through policy and management actions, and localities do not have the necessary financial resources for many accommodation or protection strategies.
- State should take a strong leadership role, incorporating flood and sea level rise management into state purviews.
- Localities should be enabled to implement adaptation strategies, but did not want the state to mandate specific adaptation strategies.
- Recommended state authorization and support that would allow each locality the opportunity to address flooding and sea level rise in their own way.

Recommendation

The State should request an expert review of local government legal authority to address current and projected flooding risks and what levels of evidence are likely to be required to justify locality action. The State should then enact any enabling authority needed to allow localities to address current and projected flooding issues.

Recommendation

The State should take a lead role in addressing recurrent flooding in Virginia for the following reasons:

a. Accessing relevant federal resources for planning and mitigation may be enhanced through state mediation.

b. Flooding problems are linked to water bodies and therefore often transcend locality boundaries.

c. Resource prioritization efforts will require consistent or standardized assessment protocols across all localities and regions.

d. Localities do not feel enabled to address all flooding and sea level rise issues.