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THE CHALLENGE OF MITIGATING VIRGINIA'S FLOODING AND SEA LEVEL RISE IMPACTS



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EXECUTIVE SUMMARY

Virginia's Hampton Roads region has the highest rate of relative sea level rise on the Atlantic Coast and a growing list of flood-damaged properties. This creates a longer wait for relief and raises the cost of flood mitigation and sea level rise adaptation. Changes to the National Flood Insurance Program are compounding the problem as increased policy premiums drive homeowners and business owners to start adaptation work as well. Despite these new challenges, the opportunity for innovative financing mechanisms positions Hampton Roads to lead other coastal communities into an adaptive future and to create jobs in the process.

The financial and personal costs for flood mitigation to individual property owners are not yet calculated and are hard to document. Wetlands Watch searched for estimates of these costs and, in four Hampton Roads localities where we could find consistent data, the results were staggering: over \$430,960,000 in unmet flooding mitigation costs for private structures that have experienced flood insurance losses. While Federal flood mitigation funding remains static, flood damages increase with sea level rise, literally and figuratively stranding people in their homes and businesses.

At current rates of hazard mitigation payments from the Federal Emergency Management Agency, it will take between 78 and 188 years to clear this backlog of flood-damaged property needs. In the interim, thousands more houses and businesses will be added to these lists.

This puts Virginia at a crossroads. Without adequate funding to meet our mitigation and adaptation needs, property owners in coastal communities stand to lose their property investments and municipalities will see their property tax base decline. Fortunately, existing funding models in Virginia offer additional funding solutions.

Publicly financed revolving loans are currently used in Virginia to fund various infrastructure improvements; flood mitigation/sea level rise adaptation is an improvement ripe for financing through a revolving loan fund. In addition, private financing can be applied to meet these needs, in the form of redevelopment loans or mitigation mortgages, similar to those used for energy efficiency improvements.

With this funding, jobs will be created and money will be saved. Using standard job creation calculations for remodeling work, the backlog of \$430+ million in mitigation costs for just four cities could provide over 9,200 construction jobs and numerous other jobs in design, engineering, and finance. A common statistic indicates that every \$1 spent on mitigation saves \$4 in avoided recovery costs.

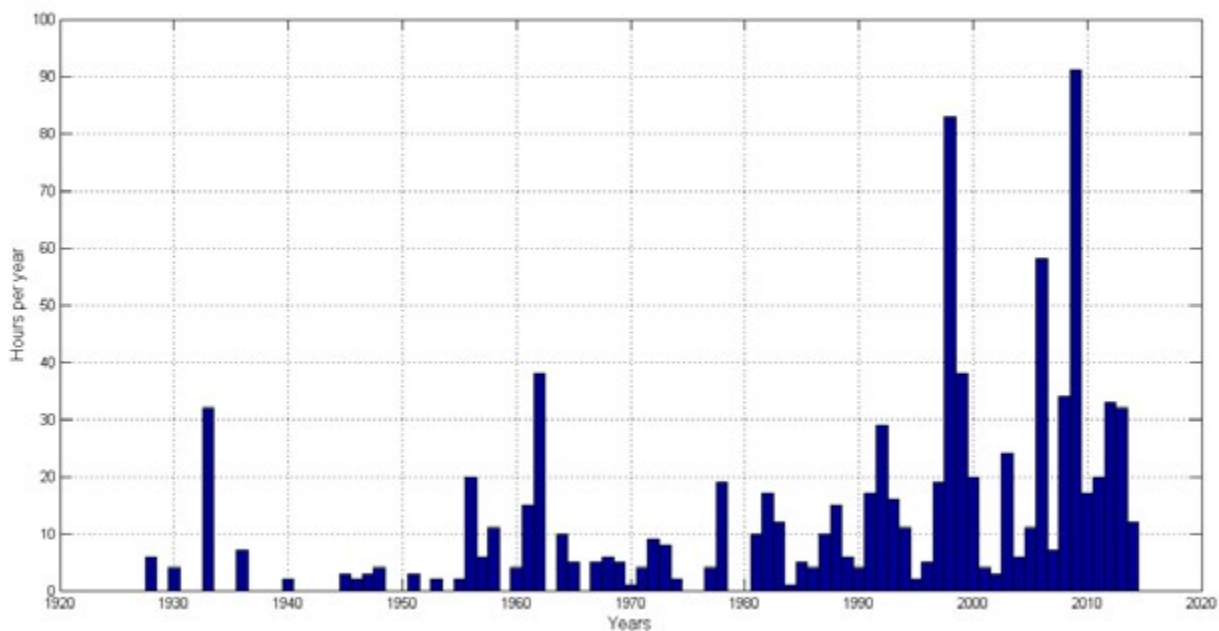
This study shows a very large unaccounted cost and unacceptable delays in dealing with our flooding and sea level rise challenges. The study also shows some simple approaches to turn this challenge into an opportunity.

SEA LEVEL RISE IMPACTS IN HAMPTON ROADS

INCREASED STORM FLOODING

Hampton Roads is experiencing the highest rate of measured sea level rise on the Atlantic Coast: 1.45 feet/100 years, as shown by the National Oceanic and Atmospheric Administration’s tidal record at Sewells Point tide gauge in Norfolk, VA (Eggleston and Pope). This flooding impact from sea level rise is clearly illustrated in Figure 1, which shows the hours per year that flooding has occurred in Norfolk above the nuisance flood level. Increased flooding is occurring with all storm events, not just the named storms, as was the case in the past. In some recent cases, flooding is occurring simply with higher than normal tides.

FIGURE 1- HOURS PER YEAR ABOVE NUISANCE FLOOD LEVEL IN NORFOLK, VA



Source: Larry P Atkinson, Personal Communication, November 2014.

Virginia’s coastal communities will experience the full risk of sea level rise during major flooding events, as storm surges ride upon a higher mean sea level. This increased risk is illustrated in Table 1, detailing the major storms of record at Sewells Point. The chart uses storm surges normalized to current water levels, benchmarked to mean higher high water (MHHW), which is the average of the higher of the two daily high tides over a 19-year cycle.

Based upon the centennial rate of measured sea level rise at Sewells Point (1.45 feet/100 years), the impacts of that increase on flooding can be projected. Using “Superstorm” Sandy as an example, a storm identical to Sandy in 1912 would have had a storm surge of only 2.64 feet above MHHW, without including the 1.45 feet of relative sea level rise since 1912. Were it not for sea level rise, Sandy would not even make this list of top storm surges.

TABLE 1 – HISTORIC STORM SURGE WITH A PROJECTED RATE OF 1.5 FEET OF SEA LEVEL RISE

DATE	STORM TYPE/ NAME	ABOVE MHHW	~2050
August 23, 1933	Hurricane	5.26 feet	6.76
September 18, 2003	Hurricane Isabel	5.13 feet	6.53
November 12, 2009	Veterans Day Nor'easter	4.99 feet	6.49
August 28, 2011	Hurricane Irene	4.76 feet	6.26
March 7, 1962	Ash Wednesday Storm	4.46 feet	5.96
October 29, 2012	Hurricane Sandy	4.09 feet	5.59
September 18, 1936	Hurricane	3.96 feet	5.46
November 22, 2006	Thanksgiving Nor'easter	3.87 feet	5.37
February 5, 1998	Twin Nor'easter (#2)	3.82 feet	5.32
October 6, 2006	Columbus Day Nor'easter	3.76 feet	5.26
April 27, 1978	Nor'easter	3.65 feet	5.15
April 11, 1956	Nor'easter	3.56 feet	5.06
September 16, 1933	Hurricane	3.36 feet	4.86
January 28, 1998	Twin Nor'easter (#1)	3.28 feet	4.78
September 16, 1999	Hurricane Floyd	3.21 feet	4.71

Source: Wetlands Watch analysis of storm surge record for Sewells Point tide gauge data

This means a relatively minor flooding event, one that would not produce any impacts on roads and properties 100 years ago, will now produce flooding on dry land. In some older neighborhoods located in tidally influenced floodplains around Hampton Roads, structures that never experienced flooding during past storm events are flooding with increasing frequency, making more properties vulnerable to flooding.

As time goes on these impacts will become more frequent and produce more significant flooding events. This is evident in the last column of Table 1. Using the projections for sea level rise for Virginia of 1.5 feet by mid-century (Mitchell, et.al.), the storm surge levels were increased to show flooding impacts produced by the identical storm in 2050. When a storm identical to Sandy returns in 40 – 50 years, it will flood more land area than the 1933 hurricane, the current “storm of record” for Hampton Roads.

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INCREASED PROPERTY DAMAGE

The increasing frequency of flooding events is already causing a corresponding increase in property damage. Data from the City of Norfolk shows that in 2009, the city had 280 frequently flooding, or “repetitive loss” properties that needed some form of flood mitigation (“repetitive loss” is defined as any structure insured by the National Flood Insurance Program [NFIP] that has experienced at least two paid flood losses of more than \$1,000 each in any 10-year period since 1978). Today that number has risen to 900 structures (Applegate), a 450% increase. As sea level rise continues, it is expected that the number of repetitive loss properties will increase further. Unfortunately, these estimates of structures in need of flood mitigation are low; they do not include all properties experiencing flood damage and in need of mitigation because they exclude those flood incidents where claims have not been filed and those properties not covered by flood insurance.

Programs to correct the repetitive flooding losses of structures are limited. Currently the Federal Emergency Management Agency (FEMA), under the Hazard Mitigation Assistance program (HMA), provides post-hazard mitigation grants to states and localities through a strict and competitive process. These funds are used to mitigate flood damage, often giving preference to repetitive loss properties covered by the NFIP. This mitigation includes a range of flood damage prevention measures, from installing flood vents on the structure, to elevating utilities, up to the elevation of the entire structure or outright purchase of the property.

Unfortunately, funding for these HMA funds has not kept pace with the increase in flood damage to structures as sea level has risen, creating a large unmet need for mitigation. Also, these funds can only be used on those properties covered by the NFIP, properties that only constitute at most one-half of the structures in high risk flood zones known as Special Flood Hazard Areas (SFHA) (Dixon, et. al.).

Other federal funds for flood hazard mitigation, such as the Community Development Block Grant funding from the Federal Department of Housing and Urban Development are available. However, these federal programs are limited in funding and are only available to areas designated in a Presidential disaster declaration. The last point is critical because funds will flow for flood mitigation only after a major storm or flooding event has occurred, which is also common with FEMA funding. This severely limits funding for anticipatory adaptation strategies in areas that do not yet flood, but will in the near future due to sea level rise.

It is important to note that these FEMA mitigation funds only apply to the insured structure. Any road, infrastructure, or other supporting mitigation need is not covered by the HMA and must be financed by other funds, usually out of the local government’s capital improvement, transportation, or stormwater funding. Additionally, these HMA funds are for individual structures or small groupings, not whole blocks of properties, shifting the burden for comprehensive approaches to flood mitigation and sea level rise adaptation onto local governments and their tax base.

Even with all these caveats and conditions, the properties applying for the HMA represent a starting point for estimating the number of properties affected by flooding and the current flood mitigation and sea level rise adaptation costs.

MITIGATION AND ADAPTATION: FINANCIAL IMPACTS AND OPTIONS

TRUE COSTS AND UNACCEPTABLE DELAYS

Wetlands Watch's community level work on sea level rise adaptation brings our staff into direct contact with people affected by flooding. In the course of this work, we heard stories of affected homeowners being stranded on "waiting lists" for HMA funding to raise or sell their flood-prone houses. Not seeing these private property needs accounted for in local government estimates of flood mitigation and sea level rise adaptation costs, we began an inquiry to determine the extent of these unmet needs.

To identify "flood-prone" properties, we used properties on the FEMA "repetitive loss" list, again defined as including any structure insured by the NFIP that has experienced at least two paid flood losses of more than \$1,000 each in any 10-year period since 1978. Included in this count are Severe Repetitive Loss structures, which have experienced even more frequent and costly flood damages. This number does not include structures not insured by the NFIP (at least one-half of the structures in the SFHA) or structures that are insured but have not filed NFIP claims when they have experienced damage.

Gathering data from floodplain managers in several localities, we determined general numbers on the costs of mitigation for flood-prone properties. The data available was not consistent across localities, so we limited our analysis to localities from which we had consistent information. Using data from Chesapeake, Hampton, Portsmouth, Norfolk, and Virginia Beach, we found that these five localities have a total of just under 3,000 repetitive loss properties. Using estimates of the average cost of mitigation (elevation or acquisition, whichever is more common) provided by floodplain managers from each city, or using the statewide average from the Virginia Department of Emergency

Management when a locality-specific average was not available, we found that the total cost to mitigate these properties would be \$430,960,000.

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We then used data from Hampton, Chesapeake, Norfolk, and Virginia Beach to calculate average annual amounts of FEMA mitigation funding received by each locality in recent years. With locality-specific mitigation funding and repetitive loss numbers, using an average cost of mitigation per locality, we calculated the number of years it would take using only funding from FEMA to mitigate all current repetitive loss properties in each locality.

The estimated waiting times to mitigate all repetitive loss properties in the localities we examined were: Chesapeake, 130 years; Hampton, 78 years; Virginia Beach, 143 years; and Norfolk, 188 years. (Table 2)

Again, these estimates of waiting time are based on 100% FEMA funding. However, since FEMA funding typically requires a nonfederal match, this number may drop by up to 25% for each locality, depending on the state, local, or private match. Increases and decreases in rates of federal funding will also change these waiting times.

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TABLE 2 - REPETITIVE LOSS DATA BY LOCALITY

LOCALITY	# OF REPETITIVE LOSS PROPERTIES	AVERAGE COST OF MITIGATION	TOTAL COST OF MITIGATION	AVERAGE ANNUAL FEMA FUNDING	# OF YEARS TO MITIGATE W/ FEMA FUNDING ALONE
Chesapeake	409	\$250,000	\$102,250,000	\$787,500	130 years
Hampton	863	\$75,000*	\$64,725,000	\$833,333	78 years
Norfolk	900	\$162,500	\$146,250,000	\$778,000	188 years
Portsmouth	186	\$75,000*	\$13,950,000	N/A	N/A
Virginia Beach	561	\$185,000	\$103,785,000	\$725,000	143 years
TOTAL	2,919	N/A	\$430,960,000	N/A	N/A

*No average mitigation costs were available, so the statewide average of \$75,000 was used.

FEMA Funding Levels:

- Hampton has received \$2,500,000 since 2011
- Chesapeake has received \$6,300,000 since 2006
- Norfolk has received \$3,890,000 since 2009
- Virginia Beach has received \$2,900,000 since 2010

Note: The most recent data available for Chesapeake, Norfolk, and Virginia Beach is from September 2014; for Hampton, data is from 2013.

These numbers are very preliminary and do not represent a rigorous review of all of the funding needs for flood mitigation in tidewater Virginia or even in Hampton Roads. However, they point to a very troubling situation wherein many hundreds of millions, perhaps billions, of dollars are needed just to meet today’s flooding remediation needs along Virginia’s tidal reaches. They reveal thousands of households placed in line for help only to wait decades or centuries for relief. Finally, as illustrated above, these figures will only get larger as a result of sea level rise, with increases in the frequency of damaging flooding events further increasing the number of structures in flood-prone areas needing remediation.

These preliminary figures are also on the lower end of full mitigation and adaptation needs because they do not account for properties in flood-prone areas that do not participate in the NFIP (again, about one-half of the properties) or properties that have been damaged by flooding but for which claims were not filed. Additionally, these estimates only account for structures, not infrastructure such as roads and utilities that will also need to have flooding impacts addressed.

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These figures also do not account for an emerging set of mitigation needs driven by increases in premiums for federal flood insurance. With reforms to the NFIP effective beginning January 1, 2013, flood insurance premiums are increasing in Virginia’s coastal communities. In some cases, these premiums increase by thousands of dollars annually, making properties with high premiums less attractive to potential buyers. Affected neighborhoods risk lower real estate values, and potentially lower property tax bases, as a result.

Simple flood mitigation measures can significantly reduce flood insurance premiums. Recently insurance agents, realtors, and specialized flood risk mitigation contractors have started working together to develop affordable approaches to reducing flood insurance premiums. This activity represents another area of flood mitigation needs beyond those of the NFIP repetitive loss properties, taking place entirely within the private sector. This activity adds to the total mitigation and adaptation financing needs, discussed in more detail below.

VIRGINIA NEEDS INNOVATIVE FINANCING

As shown above, there is not enough direct government funding to meet the flood damage mitigation and sea level rise adaptation needs for residential and commercial properties in Virginia.

There are many hundreds of millions – likely many billions – of dollars in mitigation and adaptation needs for repetitive loss properties that are not being counted as we calculate the costs of flooding and adaptation to sea level rise in Virginia. In addition, local government infrastructure adaptation needs and the additional mitigation measures taken to reduce flood insurance premiums add to this cost.

Unfortunately, the restrictions on available government flood hazard mitigation funds make many commonsense, value-added solutions difficult or impossible. As noted above, HMA funding involves only eligible structures that have already suffered a number of flooding events. It does not cover the costs of infrastructure flood mitigation needs, such as raising roads, resetting stormwater systems, and making other necessary infrastructure changes to maintain the usefulness of properties. Furthermore, this single structure, post-flooding approach frustrates a locality seeking to anticipate future flooding due to sea level rise, or seeking a larger solution to mitigate flooding in an entire neighborhood (storm surge barriers, dikes, pump stations, comprehensive buy-out programs, etc.).

The challenge going forward is to find innovative financing mechanisms, in both the public and private sectors, to provide additional mitigation and adaptation funding outside of existing government programs. Without this innovative financing, shoreline communities in Virginia will suffer a slow decline as mitigation and

adaptation funding lags behind increasing impacts. As a result, neighborhoods will become less attractive to existing residents and potential new residents. Without innovative financing, property tax values will decline and local governments will have fewer resources to address flood mitigation needs, accelerating the downward cycle.

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There are some simple first steps to immediately increase mitigation and adaptation funding, maintain current property tax values, avoid disruption of real estate values, and create jobs.

Despite the many challenges facing our region, there are some simple first steps to immediately increase mitigation and adaptation funding, maintain current property tax values, avoid disruption of real estate values, and create jobs. Examples of financing mechanisms can be found in existing revolving loan funds created in Virginia to meet environmental, public safety, and economic development needs. Other examples can be found in innovative mortgage programs designed to reward sustainable practices. Finally, there is an innovative mitigation fund recently established in Connecticut that serves as a model for adoption in Virginia.

Revolving Loan Funds

There are a number of revolving loan funds established in Virginia to meet public goals. Most of the statewide funds are administered by the [Virginia Resources Authority \(VRA\)](#). The VRA administers the [Clean Water Revolving Loan Fund](#), the [Drinking Water Revolving Loan Fund](#), the [Airports Revolving Loan Fund](#), and the [Dam Safety and Flood Prevention Fund](#). (The Dam Safety and Flood Prevention Fund does support some flood prevention activities, mostly in the area of outreach and education, and is focused mainly on dam safety.) The Clean Water Revolving Loan Fund added a [Land Conservation Loan Program](#) authority in 2003, which allows the acquisition of land/open space where it could be shown to contribute to water quality improvement.

Preservation Virginia, a private non-profit organization, administers a [Historic Preservation Revolving Fund](#). Until its transfer in 1999, this fund was administered by Virginia state government and its initial capital charge was from appropriated funds. This Fund provides an interesting model for using public funds for individual, privately owned structures and properties and for administration by a non-profit, third party.

Regionally, the Middle Peninsula Planning District Commission operates a [revolving loan and grant fund for onsite septic repair costs](#). The program provides financial assistance to individuals with malfunctioning, failing, and absent on-site wastewater treatment systems. The program is available to homeowners in the Middle Peninsula Planning District of Virginia. This fund often receives capital charges from the Virginia Clean Water Revolving Loan Fund.

Flood Mitigation Revolving Loan Fund

These loan funds offer low-cost loans to meet the loan program purposes; as the loans are repaid, the returned funding is lent out to new recipients to finance additional work, multiplying the original capital charge or investment. It would be fairly simple to create a similar fund for flooding/sea level rise mitigation and adaptation that would allow many more properties to be flood-proofed. Such funds could begin to eliminate the backlog of properties waiting for remediation, act as an economic stimulus by creating thousands of construction trade jobs, and restore the value of affected properties, preserving the property tax base.

The terms of a mitigation/adaptation revolving loan program can be structured in a number of ways, by focusing loans on structures: in certain areas that flood frequently, (with certain levels/percentage of a structure's value in flood losses), in known high-risk flood areas (regardless of existing loss, anticipating future flooding), owned by households with certain income levels, with certain types of structural uses (residential, rental, multi-family rental, commercial, etc.), and so on.

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Funding a Flood Mitigation Revolving Loan Fund

The capital infusion of funding can be accomplished in a number of ways as well. Direct appropriation of funding or tax and revenue set asides have been used in current Virginia revolving loan funds. Bond funding by local and state government can also provide the initial capitalization, perhaps even using “[green bonds](#)” as a marketing push. Funding can be done by a single locality, although a regional approach would be preferable.

The regional approach could be achieved through a special service district (SSD) devoted to mitigation and adaptation efforts. State code allows the creation of these SSD's and they could be used as the fiscal entity developing regional programs for these efforts, much preferable to single municipality efforts. Similarly, Virginia state code allows the establishment of "Drainage, Soil Conservation, Sanitation, and Public Facilities" districts providing other models of organization for these efforts. While funds under these SSD's are somewhat limited and cannot be used for individual property benefit, they could be used for projects to protect a cluster of properties or to fund needed flood mitigation for existing infrastructure. A special legislative authorization for a "mitigation/adaptation SSD" could be tailored in a number of ways to allow funding to flow to individual property owners.

Another option for mitigation/adaptation funding is a recently-established program in the state of Connecticut, Shore Up Connecticut, a shoreline resiliency loan fund. This fund was established with \$25 million in general obligation bonds issued by the state of Connecticut. This marks the first time a state government has taken comprehensive action to deal with the financial aspects of coastal flooding adaptation. At present this is not a revolving loan fund, but it does fund up to \$300,000 per residence or small business structure at reasonable interest rates (2.894% APR – fixed). Of additional interest for sea level rise, the mitigation work must be set to the 500 year flood level + one foot, because state money is involved. The program is administered through the nonprofit Housing Development Fund.

Adaptation Mortgages/Refinancing

Beyond the repetitive loss properties, the lack of mitigation funding can have broader impacts, as briefly mentioned above. As flood insurance premiums rise on previously subsidized, older properties, real estate sales are affected. Affected households pay elevated rates of flood insurance, increasing the property's cost of ownership and making the property less attractive. This causes some properties to be worth less as sellers lower their asking price to offset the flood insurance costs. This impact is being observed now in Hampton Roads. Alternatively, but resultant of the same impact, homeowners are removing slow to sell properties from the market and converting them to rental properties. Unchecked, this trend can erode the property tax base and change ownership patterns in neighborhoods within many low-lying localities.

Flood damage mitigation measures taken on these properties can reduce flood insurance premiums, restoring much, if not all, of the marketability and value to these properties. Relatively simple solutions are available to increase the funding for the mitigation/adaptation work on residential and commercial properties, borrowing examples from other areas of need and, in one case, from another part of the country.

We can learn from and modify models for private lending to homeowners for broader social and environmental goals in the energy efficiency area. Energy Efficiency Mortgages (EEM) and Energy Improvement Mortgages (EIM) incorporate the savings from energy efficiency measures and retrofits into the homeowner mortgage calculations, allowing buyers to purchase energy-efficient homes or retrofit existing homes with energy efficiency measures. These programs evolved in the 1980's and 1990's as the nation sought to incentivize energy efficiency measures on existing housing stock.

Backed by the federal mortgage insurance and underwriting agencies (Fannie Mae, Freddie Mac, Federal Housing Administration, Veterans Administration) EEM mortgages include the energy savings into the loan calculations, increasing the household cash flow, allowing people to buy energy efficient homes they could not otherwise afford. Under a EIM, a larger mortgage is allowed with the additional funds rolled into the mortgage and set aside, to be paid to the homeowner once the energy efficiency retrofits have been installed.

Flood Mitigation Mortgages

Similar mortgage arrangements can and should be created for flood mitigation and sea level rise adaptation. These mortgages will reduce household cash flow (through lower NFIP premiums) and maintain or increase the value of the house. With a range of mitigation and adaptation options available, starting with installing flood vents, to raising HVAC systems, all the way to structural waterproofing and structural elevation, these mortgages could cover this range with a set of eligible practices, scaled to household income thresholds. Available to the buyer, or as a refinance option to an existing homeowner, these mortgage options could have a great deal of flexibility.

Already in Hampton Roads, some banks are offering conventional Federal Housing Authority (FHA) 203(k) renovation loans specifically to homes needing flood protection to reduce flood insurance premiums, to make the house more salable and valuable. A formal flood mitigation program established through federal law and/or regulation would accelerate the use of these loans and mortgages for flood mitigation. A federal flood specific mitigation mortgage underwriting/guarantee program would focus attention on the need, broaden the participation and use of these loans, and reduce the backlog of properties waiting in line for flood mitigation funding. It could also stimulate additional mortgage loan activity, providing economic benefit to banks and credit unions.

A federal flood specific mitigation mortgage underwriting/guarantee program would focus attention on the need, broaden the participation and use of these loans, and reduce the backlog of properties waiting in line for flood mitigation funding.

FULL MITIGATION AND ADAPTATION FUNDING BENEFITS

FOSTER COMPREHENSIVE COMMUNITY ADAPTATION

Current post-hazard mitigation funding is focused on a single repetitive loss property with eligibility determined by a complex set of rules that also constrain adaptation options. Often when a property is elevated, adjacent properties with similar impacts, or impacts not yet realized, can wait years or decades before they are elevated. This frustrates comprehensive approaches to mitigation involving multiple properties, especially in those areas where mixed owner-occupied and rental properties are adjacent, as different rules apply to each class of property.

These rules also frustrate common-sense adaptation options that involve tear-down and rebuild in a different configuration than the original structure, even if the new configuration is more resilient than a simple elevation on the same footprint. They also impede multiple actions on adjacent properties that would yield economies of scale that can lower overall costs for the whole community.

Alternative financing mechanisms, especially those administered by the flood-impacted communities, can evade those restrictions and result in more comprehensive mitigation options and mitigation approaches better fitted into flood-prone neighborhoods. The freeing of US Department of Housing and Urban Development Community Development Block Grant funding for post-Sandy disaster relief and hazard mitigation was an example of how new funding sources yield new mitigation options.

CREATE JOBS

The hundreds of millions of dollars of mitigation/adaptation costs represent jobs. The flood mitigation and sea level rise adaptation work must be done to protect private property, maintain a locality's property tax base, and protect taxpayer/ratepayer exposure through the NFIP. If we can adopt innovative financing as described above, this work will continue for decades and employ many people in the banking, insurance, design, and construction sectors in Hampton Roads. Additionally, the expertise that is created here can be exported to other coastal regions, spurring greater job creation.

\$431 million in mitigation costs would create over 9,200 jobs.

While figures are inexact, using estimates for remodeling job creation (20 jobs/\$1 million in rehab outlays) in just the four cities studied the \$431 million in mitigation costs would create over 9,200 jobs (Econsult, Bell). Moreover, as stated above, this "repetitive loss" mitigation demand figure is a very low estimate, of the total cost for reducing flood impacts. With innovative financing mechanisms, thousands of jobs can be created in a new flood mitigation sector.

SAVE MONEY AND REDUCE RISK EXPOSURE

In addition to creating jobs, money spent today on mitigation will save millions or billions of dollars in the future on avoided disaster recovery costs, while also making communities more resilient by reducing disruption to everyday life during and after flood events. Research shows that every dollar spent on mitigation will save four dollars on disaster recovery (Multihazard Mitigation Council), reducing economic disruption, lowering physical and emotional drain on affected residents, and allowing communities to get back on their feet more quickly after an event.

CONCLUSION

A significant backlog of tidewater Virginia properties need flood mitigation and this need for mitigation and adaptation will increase with sea level rise. While the current need and cost is staggering, there are new and innovative approaches available for financing mitigation and adaptation in Virginia. These new methods will improve community resiliency by increasing mitigation and adaptation rates, will create jobs and stimulate the local economy, and will protect property owners from flooding while simultaneously reducing their flood insurance rates.

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ABOUT WETLANDS WATCH

Wetlands Watch, an environmental non-profit located in Norfolk, VA operates statewide to conserve and protect wetlands through education and advocacy. Since 2006, we have worked to help coastal communities in Virginia adapt to sea level rise and conserve our coastal ecosystem as the only environmental nonprofit working at the local governmental level on sea level rise adaptation.

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In an effort to broaden public engagement in sea level rise adaptation, Wetlands Watch has developed an iPhone app to track flooding. The logo above is from the “Sea Level Rise” app that can be downloaded on iTunes.