

City of Portsmouth, Virginia 2015 Floodplain Management and Repetitive Loss Plan Update

August 2015



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Picture on cover: Paradise Creek is a 40 acre park-in-progress in the heart of a working harbor. It is the cornerstone project of a unique and innovative 250 acre conservation site on the Elizabeth River. The park is a partnership of the Elizabeth River Project, the City of Portsmouth, and the Virginia Port Authority. It has 2.3 miles of trails, 11 acres of restored tidal wetlands, pervious parking spaces that absorb rainwater runoff, a 275' pedestrian footbridge, an "Earthworks Mound", and landscaping to revitalize 29 acres of urban forest with native trees, shrubs and flowers. The park opened to the public on Dec.28, 2012.
www.paradisecreeknaturepark.com



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City of Portsmouth, Virginia

2015 Floodplain Management and Repetitive Loss Plan Update

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EXECUTIVE SUMMARY

The City of Portsmouth is located in southeastern Virginia, 18 miles from the confluence of the Chesapeake Bay and the Atlantic Ocean. The city is home to one of the world's greatest natural harbors, situated on the James and Elizabeth Rivers. Portsmouth's location and approximately 78 miles of shoreline have shaped the city's history and economy.

As part of the Port of Hampton Roads, much of the city is dominated by maritime and military activities associated with the port. The Port of Hampton Roads is the largest volume port on the East Coast and handles in excess of 12 million tons of general cargo annually. The Norfolk Naval Shipyard, located along the Southern Branch of the Elizabeth River, employs approximately 7,400 people. In addition, the city contains Portsmouth Naval Hospital, the longest operating naval hospital in the country.

Unfortunately, like many coastal cities, Portsmouth faces a year round threat of flooding. This threat results from storm surges associated with nor'easters, tropical storms and hurricanes, and urban flooding due to heavy precipitation. This is compounded by the city's relatively low elevation and limited drainage gradient which allows for non-tidal flooding of streets and private property due to the inability to drain large volumes of rainwater through the storm drain system during times of high tides. Managing the floodplain within the city largely involves mitigating existing structures. By the time Portsmouth entered the National Flood Insurance Program (NFIP) in 1971, a majority of the city had been developed.

Since Portsmouth was settled in 1752, it has experienced numerous flooding events related to coastal storms or hurricanes, including the flood of record as a result of the Chesapeake/Potomac hurricane of August 23, 1933, with a recorded tide of 6.4 feet North American Vertical Datum of 1988 (NAVD88) at Sewells Point, Virginia (NOAA) which left most of downtown Portsmouth and other low-lying areas under water. Flooding events in the first two decades of the 21st century have continued to affect Portsmouth. As of November 2014, the City has had **1,422** flood insurance claims totaling **\$13,847,168.22** in damages (FEMA, 2014). The latest tidal event to affect Portsmouth was Hurricane Sandy on October 29, 2012.

Another indicator of the severity of flooding is the number of Repetitive and Severe Repetitive Losses within the community. A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling ten-year period, since 1978 (FEMA). These repetitive loss structures nationwide account for approximately 2% of the insured properties but have received over 40% of the claims paid. A Severe Repetitive Loss (SRL) property is defined as a residential property that is covered under an NFIP flood insurance policy and that has had at least four NFIP claim payments over \$5,000 each and the cumulative amount of such claims exceeds \$20,000; or for which at least two separate claim payments (building only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building. For both alternatives, at least two of the claims must have occurred within any ten-year period and must be greater than 10 days apart. As of June 2014, there were 220 RL and 12 SRL properties within

the city. According to the Hazard Mitigation Plan for the Commonwealth of Virginia, Portsmouth has the seventh highest number of repetitive losses. (VDEM, 2013)

The first Flood Insurance Study for Portsmouth was published dated May 1971. The first Flood Insurance Rate Maps (FIRMs) were published in 1983 and set Base Flood Elevations at 8.5 to 9 feet National Geodetic Vertical Datum of 1929 (NGVD29) in the city in areas along tidal rivers and streams. These maps were updated in 2009, converted to digital form and incorporated into the City's Geographic Information System. In 2014, new, preliminary FIRMs were developed to incorporate new coastal modeling. Based on the preliminary FIRMs, there are 8,322 parcels within the Special Flood Hazard Area or 1 percent annual chance floodplain.

An issue that will exacerbate flooding is sea level rise. Globally, sea level is rising along most of the U.S. coast, and around the world. Sewells Point, Virginia, has recorded a relative sea level rise equivalent to 1.46 feet in 100 years (NOAA). Higher temperatures are expected to further raise sea levels by expanding ocean water, melting mountain glaciers and small ice caps, and causing portions of the Greenland and Antarctic ice sheets to melt. The exact magnitude of increase has been debated, but ranges from between 1.31 to 6 feet in the next century (U.S. Army Corps of Engineers, 2015). This rise in sea level would result in a loss of between 1.0 and 3.6 square miles of land in the city of Portsmouth. This rise in sea level will become an increasingly important component of the City's Floodplain Management Program.

With nearly a quarter of real estate impacted by flooding and more threatened through sea level rise, Portsmouth actively manages the floodplain to protect the livelihood and continued resilience. The floodplain management strategies make the city eligible to participate in the NFIP's Community Rating System (CRS), a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS; reduce flood damage to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. In exchange for undertaking this process, citizens benefit from reduced flood insurance premiums and improved flood risk. Additionally, communities are typically better prepared to take advantage of available Federal and state funding and grant programs. A key component in this assessment process is preparing and routinely updating the local Floodplain Management Plan. Portsmouth prepared its first Floodplain Management Plan in 2005. In 2010, the plan was updated. This Plan is the second review and update of that original Plan. As with the previous plans, the 2015 Floodplain Management and Repetitive Loss Plan Update would not be possible without the support and input of the city staff and volunteers. This document reflects input and comments supplied throughout the development process. In addition, this document is meant to be updated as new information becomes available.

The following is a list of some actions completed since the completion of the 2010 Floodplain Management Plan:

- Staff prepared and updated an interactive map, with new FIRMs, on the City's web site that allowed citizens 24 hour access,
- Obtained new preliminary Flood Insurance Rate Maps, dated January 13, 2014,
- Proposed a new floodplain regulation that set the freeboard requirement at 3 feet, maintained a new definition for substantial damage to reduce future claims, and prohibited storage of hazardous materials in flood hazard zones.
- Updated comprehensive Repetitive and Severe Repetitive Loss Area maps.
- Worked with property owners to obtain grant funding to elevate seven structures. Elevation projects were at no cost to the City.

Some of the major actions recommended as short and long term ongoing activities include:

- Ongoing education of citizens and local officials about the complexities and challenges of managing floodplain areas and mitigating flood damages,
- Maintain and enhance the interactive floodplain mapping available over the internet,
- Floodproof key utility equipment demonstrated to be susceptible to flooding,
- Coordinate actions with those recommendations and actions contained in the City Wide Drainage Needs Assessment completed in March 2007.
- Work with owners of properties that have demonstrated a repetitive loss to mitigate future flood related damages, and
- Develop a series of strategies and potential funding sources for areas experiencing repetitive losses.

INTRODUCTION

The National Flood Insurance Program (NFIP) provides federally supported flood insurance for communities that regulate development in floodplains and take active steps to mitigate the hazards of flooding. The Community Rating System (CRS), a voluntary program under the NFIP, grades community Floodplain Management Programs and reduces flood insurance premiums for citizens whose Communities meet certain requirements. In order to reduce the potential for personal/property losses and ensure the lowest possible flood insurance rates for our citizens, the city of Portsmouth has pursued a Floodplain Management Program to maximize compliance with the standards of CRS. One facet of this compliance is updating the Floodplain Management Plan, last adopted 2010. The new Plan will detail the City's flood hazards, our efforts to reduce losses during both tidal and severe rainfall events, and propose actions for the future. For more information regarding CRS, please visit http://www.fema.gov/media-library-data/20130726-1708-25045-7720/99032_nfip_small_brochure.pdf

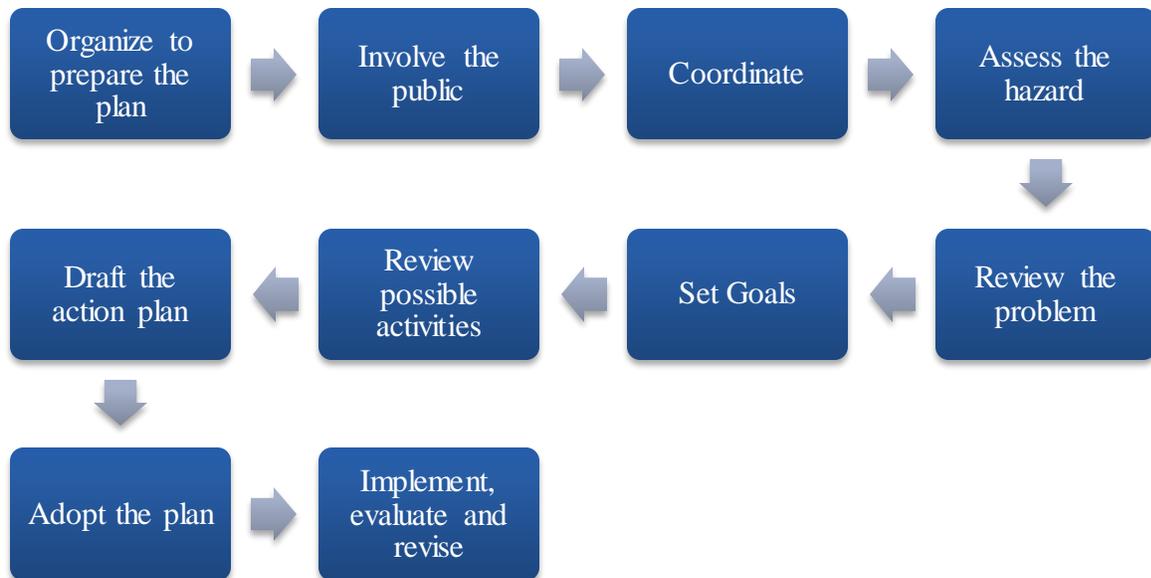


PURPOSE

The objective of floodplain management, a component of hazard mitigation planning, is to produce a program of activities that will reduce the community's vulnerability to the flooding and meet other community needs. A well-prepared plan will:

- Ensure that a comprehensive review of possible activities and mitigation measures is conducted so that the most appropriate solutions are used to address the hazard.
- Ensure that the recommended activities meet the goals and objectives of the community, do not create conflicts with other activities, and are coordinated to reduce the costs of implementing individual activities.
- Educate residents about the hazards, loss reduction measures, and the natural and beneficial functions of floodplains and inform them as to their potential at-risk status.
- Assist in reducing damages and protect citizens from life-threatening situations.
- Assist in reducing recovery time and effort.
- Build public and political support for projects that prevent new problems, reduce losses, and protect the natural and beneficial functions of floodplains.
- Build a constituency that wants to see the Plan's recommendations implemented.

The CRS outlines 10 steps for developing a Floodplain Management Plan.



For this document Steps 4 and 5 have been combined in Chapter 4.

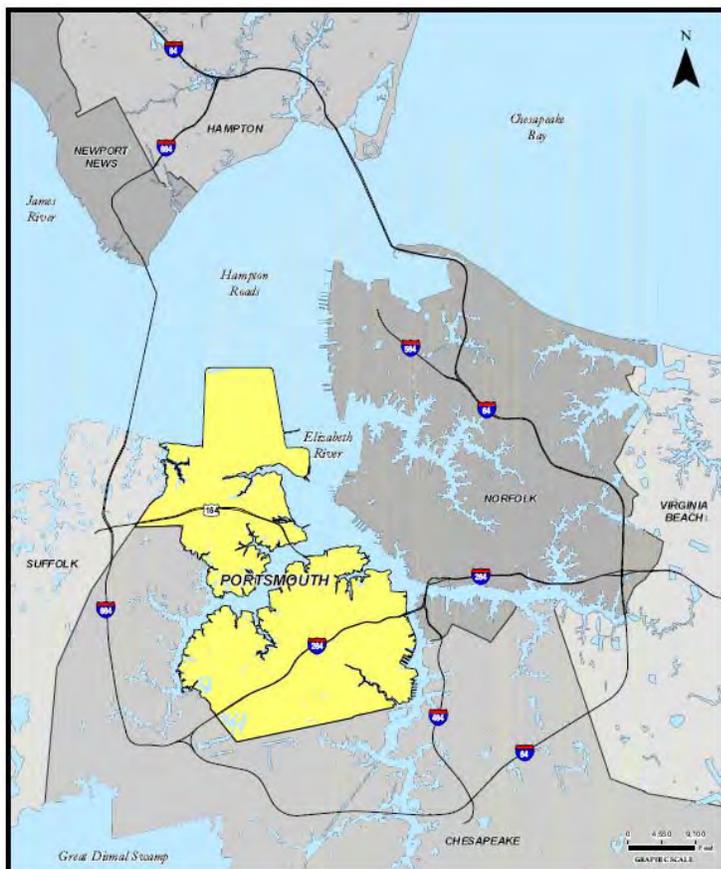
1. ORGANIZE

Authority

The authority to prepare, adopt and implement a plan to mitigate potential hazards to the citizens of the city of Portsmouth can be found in the following:

- The NFIP requires that the local ordinance be legally enforceable and enforced uniformly throughout the community (44 Code of Federal Regulations). The CRS Program requires the adoption of a local plan.
- Sections § 10.1-546. Development of programs and plans and § 10.1-659. Flood protection programs; coordination of the Code of the Commonwealth of Virginia all allow the adoption of plans to mitigate and protect citizens' property and reduce soil erosion for flooding events.

Location



The City of Portsmouth is located in the coastal plain, in southeastern Virginia near the Hampton Roads Harbor, where the James and Elizabeth Rivers join together and empty into the Chesapeake Bay. It is a historic seaport that contains the first naval shipyard and numerous historic communities. The City was settled in 1752 and incorporated by the Virginia General Assembly in 1858. Over 260 years old, the City is home to one of the world's greatest natural harbors. Portsmouth, with a land area of approximately 29 square miles and a population of 96,205 is located in the hub of the Hampton Roads Region. It is bordered by the cities of Chesapeake and Suffolk respectively to the south and west, and by the city of Norfolk to the east.

Background/History

With 75.8 miles of shoreline at the zero milepost of the Atlantic Intra-coastal Waterway, which runs from Boston to Florida, Portsmouth's location on navigable waterways has been a dominant force in its history and economy. Its location on the over 40 feet deep Hampton Roads shipping channel, and the presence of both the CSX and Norfolk Southern Railroads in the City supports the national and international port commerce activities and military presence in the region.

In city of Portsmouth, as in many older coastal communities, during the 1800's and early 1900's the marsh areas and creek beds were used as convenient dumping grounds for waste and debris. Through this filling of the marsh lands, additional "dry" land was created and developed. However, this new land was prone to flooding and thus began a vicious cycle of flooding events. Overlaying a survey from 1823 onto a current base map of the Olde Towne area, the map to the right identifies the areas filled and built upon.

Portsmouth is an independent city chartered by the General Assembly of the Commonwealth of Virginia. The governing body of the City is the City Council, which formulates policies for the administration of the City. The City operates under a Council- Manager form of government with the City Council establishing the policies and laws for the administration of the City.

There is no overlapping debt or taxing powers with other political subdivisions. The water and sewer systems are operated on a self-supporting basis.



Existing Conditions

When a plan is in the development stage, the first step is to assess the existing conditions. Through this assessment all interested parties develop an understanding of the current conditions that could in many instances dictate the direction of action developed for this plan. A snapshot view of Portsmouth reveals:

The City adopted a Comprehensive Plan, *Destination 2025*, in 2005 that addresses continued participation in the NFIP (page 75 and 78 of the Comprehensive Plan).

Almost half of the land within the city is nontaxable property because it is owned by Federal, state, and non-profit agencies or is tidal wetlands.

A snapshot description of the City can be found in Appendix A based on the 2010 Census (Bureau, 2013) and 2013 Census Bureau estimates of the Portsmouth's population. Some unique statistics that bear strong consideration are the ones dealing with age, education, and wages.

Geography Quick Facts	
Land Area, 2010	33sq. mi
Population, 2010	96,205
Population, 2013, estimate	95,535
Persons per sq. mile, 2010	2,838.8
Median household income	\$46,166
Persons below poverty level Percent, (2009 – 2013)	18.4%

The statistics highlighted above serve to paint a picture of a distressed urban population. Due to the large portion of the City dedicated to Federal and nonprofit land use and low income, limited means and opportunities are available for the City to fund flood mitigation projects. Without the use of grants or state and federal projects, financing is a true challenge.

2. INVOLVE THE PUBLIC

The Portsmouth Floodplain Management Plan Task Force

On October 8, 2014, the City of Portsmouth hosted the initial meeting of the Portsmouth Floodplain Management Plan Task Force. The purpose of the task force is to engage the public and develop new development standards. From its beginning, the process was used successfully to update floodplain regulations, Chesapeake Bay Protection regulations, and the adoption of new FEMA Flood Insurance Rate Maps. Through public discussions of the flooding issues facing Portsmouth three major additions were included in the proposed regulations. These additions were:

1. The adoption of freeboard requirements of 3.0 feet, an increase of 1.5 feet above the last freeboard.
2. The maintenance of the definition of substantial damage that uses cumulative values over a five-year period. The City of Portsmouth had the only community within the Hampton Roads area that regulated cumulative substantial damage or improvement.
3. Additional regulations that prohibit hazardous land uses from being in “hazard” flood districts.

Public Input

As part of the development of this Plan, the staff has followed the “Destination Framework by:

1. Providing a “kickoff” to the project on September 23, 2014 with a presentation to the City Council. At this meeting the Council members and the public, who have viewed the meeting on the City Channel 48, learned about the existing Floodplain Management Plan and the plan to update. A resolution creating a Task Force to develop a floodplain management plan is located in Appendix B.



2. An initial meeting for citizens who are most at risk for flood hazards was held on October 8, 2014. In keeping with the framework model, staff opened the meeting with a presentation on the history and accomplishments of Portsmouth’s floodplain management program. Staff then solicited the public’s concerns and comments. During the comment period which lasted approximately two hours, citizens provided their concerns about flooding conditions in Portsmouth.

The major issue raised by participants dealt with drainage and stormwater concerns. Other issues included:

- a. Transportation flooding. Network was shut down for nearly a day following a rain event. On May 16, 2014, 3.73 inches of rain fell and made movement around the city difficult. Multiple roads were impassable and cars became stranded. Beginning on Monday afternoon, September 8, 2014 and ending Tuesday morning, 10 inches were reported in some areas of Hampton Roads. The resulting flood caught many citizens off guard as they attempted to traverse flooded roads on their commute.
 - b. Flooding in Old Towne. The High and Washington intersection is one of the lowest in the city. It frequently floods during high water events.
 - c. Concern of property elevated above flooding while access is not. For example: Old Towne becomes an island during flooding.
 - d. Poor drainage.
 - e. The need for a map or communication of traffic troublespots – areas susceptible to flooding.
3. Additional meetings were held on November 12, 2014, December 10, 2014, January 21, 2014 and February 18, 2015.
 4. The draft document was presented to the Task Force on June 18, 2015 and to the Portsmouth Planning Commission on August 4, 2015.
 5. Final Adoption by City Council was obtained on September 8, 2015. (See Chapter 7 for adopting resolution.)

3. COORDINATE

Urban localities are unique mixtures of development, locations, political activities and financial concerns. To coordinate these different facets of the urban community a description of each is needed. Once the unique conditions of each are identified, the plan can then concentrate on the coordination of activities that address the needs of each.

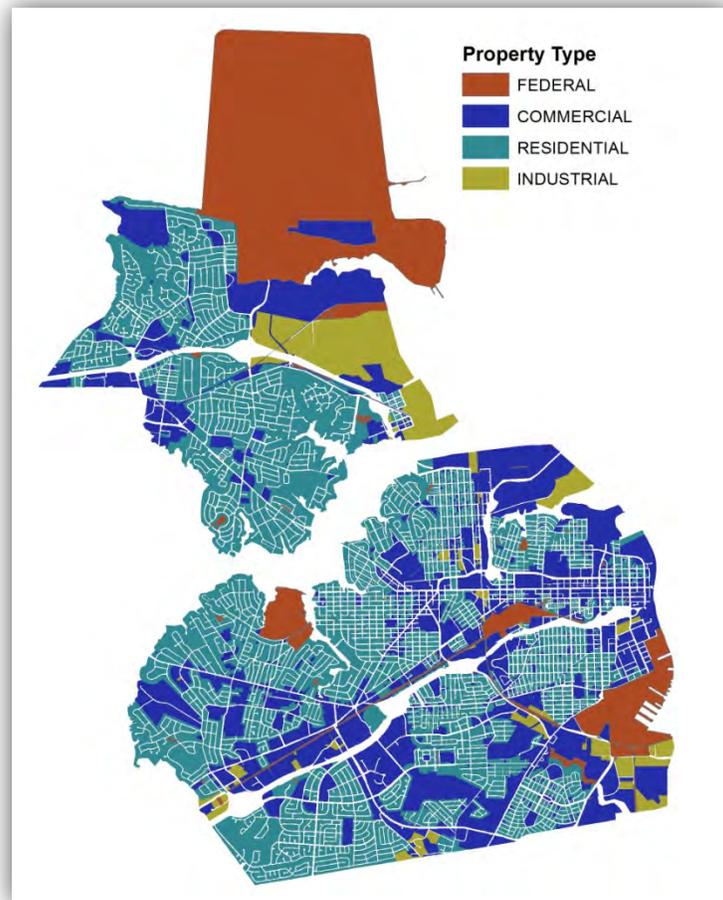
Physical

As previously indicated, the city of Portsmouth was founded in 1752. The city then grew in a series of annexations of the adjoining counties until 1968. At that time the surrounding counties incorporated into the cities of Suffolk, Chesapeake and Virginia Beach. A copy of the annexation growth of the city of Portsmouth is provided in the Appendix C of this plan.

Commercial

The city of Portsmouth is 33 square miles in size (only 29 square miles are developable) and is characterized as a developed urban community. The development that is occurring is defined as infill development. Recent Market Studies prepared as part of the long range plans for the city's downtown area call for modest growth in the region and in Portsmouth over the next 10 to 15 years. Two reasons for this new growth were cited. First, Portsmouth is situated in the middle of Hampton Roads and offers a strategic location advantage to many small and large businesses and residents and second, many areas in Portsmouth lie within state and federal incentive zones.

Currently, the most active redevelopment in Portsmouth is 135 acre development in the Victory area, known as Victory Village. This area is located south of the I-264 and Victory Boulevard interchange. The owner of the property, the Economic Development Authority (EDA) selected a master developer for this emerging business park. The Victory Village area plans created after



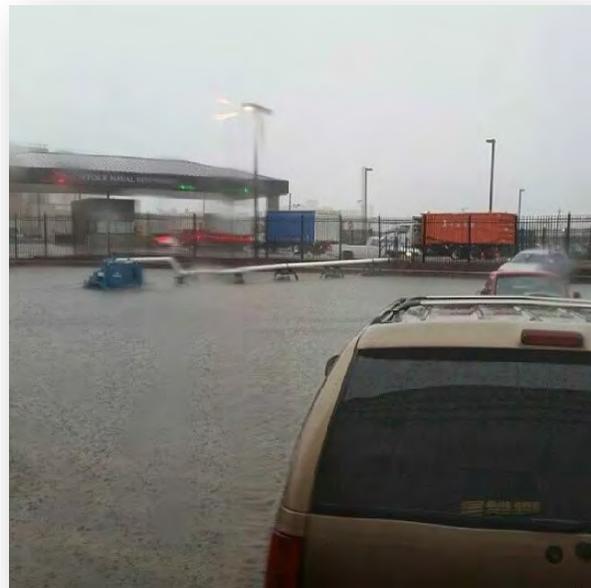
this selection call for 1.2 million square feet of mixed use development.

The initial planning phase for the new Victory Village was completed in 2008. A major component of this development is the 35-acre Fred Beazley campus of Tidewater Community College. This campus, which opened in January of 2010, already boasts an enrollment of over 11,000 students. The remaining 100 acres will be developed with a mixture of residential (not more than 25% of total square footage) and office retail.

Adjacent to the Victory Village area is the Newport complex which is a 1,600 unit residential community replacing the World War temporary housing complex known as Fairwood Homes. While this is an adjacent development to the Victory Village project a different developer has control of the project which is planned to be a mixture of single family detached and townhouse style urban development structures.

Federal

Portsmouth's partnerships, service and reliance on the military has played a dominant role in the development of the city. The Gosport Shipyard, now known as the Norfolk Naval Shipyard is located along the Southern Branch of the Elizabeth River in the southern portion of the city. This facility has been active in the building, preparation and repair of ships for military use since the Revolutionary War and continues today. The facility experienced its largest workforce expansion in the war years of 1940-1960 (World War II and the Korean Conflict). At the height of employment, the Norfolk Naval Shipyard had over 40,000 employees working three shifts. This workforce has decreased in size to today's total workforce of approximately 7,400 employees.



In addition to the shipyard, two other major military facilities are located in Portsmouth. They are:

1. The Naval Medical Center Portsmouth employing approximately 5,500 employees and located along the Elizabeth River near the downtown portion of the city and
2. The U.S. Coast Guard Support Facility employing approximately 1,900 employees and located in the Churchland part of the city.

Maritime

The Portsmouth Marine Terminal (PMT) is one of five general cargo facilities owned and marketed by the Virginia Port Authority (VPA), the Commonwealth's leading agency for international transportation and maritime commerce. Four of the VPA's marine terminals, of which two are located in Portsmouth, the PMT and the leased APM facility, is the second largest and largest, are located in the Port of Hampton Roads. The fifth facility is the Virginia Inland Port, a truck and rail transfer facility in Front Royal, Virginia.

PMT covers 219 acres, including a 27-acre CSX rail facility with over 20,000 feet of direct rail access and 41 undeveloped acres. PMT has three shipping berths with 3,540 feet of marginal wharf. Five state-of-the-art container cranes handle containerized, break bulk and roll-on/roll-off cargo. One of these is the fourth Kone Supercrane with a lift capacity of 40 Long tons (LT). PMT is a versatile facility offering refrigerated hook-ups, specialized warehouse space, fumigation facilities and straddle-carrier container stacking.

The VPA 2010 Plan recommends a \$46.4 million expansion of the PMT that includes: reconfiguring the site to maximize storage capability; paving remaining undeveloped terminal site for container storage, acquiring additional container-handling equipment, enhancing the gate to reduce the time that motor carriers have to spend on the terminal and reconfiguring existing rail facilities.



Universal Maritime Corporation borders PMT and offers an additional 1,000 feet of wharfs and two container cranes.

On September 7, 2007, APM Terminals Virginia officially opened its new \$450 million, 291- acre container terminal on

576 acres of land to serve customers in the Hampton Roads region. This world-class maritime center is the third largest container terminal in the United States and is capable of handling 1 million twenty foot- equivalent units (TEU) annually. This creates the potential to expand the port to handle a capacity of more than 2 million TEU. The terminal will serve as an economic engine for new business in the region.

The yard area features weight-sensitive booths and remotely controlled cranes – the first of their kind in the United States. To ensure safety, drivers must exit their cabs and stand inside a booth before yard cranes can load their chassis. Remote control of cranes from an operations control center in the facility's main building minimizes exposure to potential safety hazards.

The APM facility was leased to VPA in 2010. Four years into the 20 year lease the facility was sold to a private group. The Virginia Port Authority will continue to operate at the terminal, according to officials.

Medical

Midtown Portsmouth, the most central location of the city, is home to Bon Secours Maryview Medical Center. Maryview Medical Center is an acute care facility with 346 beds offering comprehensive medical services and has approximately 2,000 employees. Since 2000, the medical center has renovated and expanded its emergency room and added a birthing center and dialysis facility. In 2004, Maryview Medical Center began construction on an open-heart surgery center. As a result of the medical center's long-standing commitment to the community, a host of entrepreneurial healthcare facilities dominate the area, as it is a Mecca for healthcare related opportunities. In June 2012, the Maryview Medical Center announced the completion of an \$8 Million cancer center expansion.

As a complement to Maryview Medical Center, the city of Portsmouth is home to the U.S. Naval Medical Center, Portsmouth, the Navy's regional medical center and the nation's oldest continuously operating hospital, military or civilian. The corner stone was laid in April of 1827 and the first patients admitted in 1830.

Residential

Portsmouth's housing has been developed over the past three centuries. Currently, there are five predominately residential historic districts that delineate the most significant areas historic housing and commercial buildings. These districts are, Olde Towne, Park View, Cradock, Truxtun and Port Norfolk. Portsmouth's sixth historic District is located along the High Street Corridor in the original downtown area and is predominately a commercial historic area.



The condition of housing within the city, because of age and wide range of maintenance activities, or the lack thereof, can be described as poor to good.

Multifamily development is present throughout the city's residential neighborhoods. Large complexes, with over 16 units in the complex, comprise approximately 50% of the tenant occupied properties in the city.

The development of the housing stock, single-family and multifamily has occurred along all of the various rivers, streams and creeks that bisect the city.

Schools

Currently there are three high schools, three middle schools, thirteen elementary schools and four preschool centers in the city. Additionally, there are three alternative centers that deal with learning, physical and mental disabilities and disciplinary challenged students.

Power Generation

Electric power for the entire civilian portion of the city is obtained from a series of above ground and below ground power transmission lines.

Water Systems

The potable water supply is provided through a series of water mains that are supplied from a series of wells and lakes in the City of Suffolk. This system is approximately 100 years old.

Modifications to the dams and pumping system have been made to prevent the reoccurrence of the flooding damages realized during Hurricane Floyd in 1999.

Transportation

The transportation system is a complex infrastructure network that connects the citizens of Portsmouth to the community, region, state and world. Within a coastal communality, these vital arteries that move people, cargo and support emergency response are military operations are subject to flooding and sea level rise.

In December 2009, the city of Portsmouth adopted the City of Portsmouth Master Transportation Plan (Portsmouth, 2010). In addition to creating a detailed listing of intersections that routinely flood, the 2010 plan recommended I-264 interchange improvements at Frederick, Portsmouth and Victory Boulevards for inclusion in the Long Range Transportation Plan (LRTP). This improvement was completed in 2014.

Currently, the Portsmouth Boulevard interchange does not provide full movement access between the local streets and Interstate I-264. Approximately one mile to the west, the Victory Boulevard interchange provides full-movement access to I-264 as well as to local streets (Cavalier Boulevard and Belmont Avenue).

Victory Crossing, one of the regional activity centers identified in the Destination 2025 Comprehensive Plan, is located between these two interchanges. Development is moving forward in and near this activity center, including Victory Village Business Park, New Port, and the new Tidewater Community College campus. During the planning stages of these developments, traffic impact analyses have indicated that the Victory Boulevard interchange is reaching capacity. Given the limited available right-of-way at the Victory Boulevard

interchange, development strategies should look at enhancing the local street connections between Victory Boulevard and Portsmouth Boulevard and seek to provide full-movement access at the Portsmouth Boulevard interchange. The Portsmouth Boulevard interchange has a larger footprint than at Victory Boulevard, and interchange alternatives should seek not only to provide full access but also to provide enhanced connections to the local street network.



The I-264 interchange with Frederick Boulevard suffers from serious congestion problems. Due to the design of the surrounding roadway network, this interchange is prone to flooding during periods of heavy rains. This causes significant delays for vehicles that must seek alternative access routes, requiring a minimum 2-mile detour. Significant modifications were completed in 2014.

Beyond the inconvenience and financial loss of a flooded vehicle, impassable flooded roads can block emergency response and the readiness of the military.

In addition to the identified interchanges, the following streets are known to routinely flood:

- Frederick Blvd North at exit ramp from I-264
- 2000 Block Frederick Boulevard
- 300 Block Dinwiddie Street
- Intersection of Washington Street and High Street
- Intersection Columbia Street and Crawford Street
- 300 Block Effingham Street at North Street
- 400 Block Effingham Street at London Boulevard
- 1000 Block Effingham Street at I-264 overpass
- 700 - 1200 Block Elm Avenue
- 1500 Block County Street
- 1600 Block of High Street
- 3800 Block High Street
- 400 Block Douglas Avenue
- 300 Block Maryland Avenue
- 400 Block Florida Avenue



- 4000 Block Scott Street
- 5900 Block Arden Street
- 3500 Block Blaine Street
- 4100 Block Queenswood Drive
- 3100 Block Verne Avenue
- 1600 Block Spectator Street
- Victory Blvd exit I-264 westbound
- 1 - 17 Block Greenland Boulevard
- 400 Block Portsmouth Boulevard
- 900 Block of Portsmouth Boulevard
- 1300 Block Portsmouth Boulevard
- 300 Block Gust Lane
- 100 Block Allard Road
- 4900 - 5200 Block Johnson Avenue
- 4800 - 5600 Block Vick Street

Impact on Public Facilities

A review of principal facilities in the city indicates the following are located in or near Flood Hazard Districts: City Hall Building, Courts Building, City Jail, I.C. Norcom High School, Police Headquarters, 911 Emergency Dispatch Center, Emergency Operation Center, probation Offices, Behavioral Healthcare Offices, Administrative Office for the fire department, and Ntelos Pavilion.

There are other locations in the city where major thoroughfares are located within floodplains. In addition, numerous streets that are not in hazard districts routinely flood during storm events such as severe thunderstorms. Flooding



can occur due to the relatively low elevations of land, the presence of a number of tidal rivers and creeks that bisect many areas of the city and when stormwater outfalls become blocked by high water. Vehicular circulation in sections of the city near the various branches of the Elizabeth River would be slowed or halted during severe tidal flooding. This could hamper evacuation measures and emergency services to certain areas of the city.

4. ASSESS THE HAZARD/ REVIEW THE PROBLEM

Background

Portsmouth, like other communities in southeastern Virginia, is vulnerable to multiple natural disasters. To help address the planning and recovery from the potentially disastrous effects of these events, a regional all hazards plan was prepared and adopted by the various Hampton Roads local governing bodies. The Southside Hampton Roads Hazard Mitigation Plan, dated 2011, is the result of a comprehensive planning process undertaken by the jurisdictions of Isle of Wight County, Norfolk, Portsmouth, Smithfield, Suffolk, Virginia Beach and Windsor. Local officials, citizens and other key stakeholders from across the region contributed to the planning process. This process was designed to help communities identify ways to better protect people and property from the effects of natural hazards, including an evaluation of risks for all hazards in the region. Table 5.46, from the hazard mitigation plan, summarizes the degree of risk assigned to each category for all identified hazards in the region based on the application of the Priority Risk Index (PRI) tool fully introduced in “Methodologies Used.”

Assigned risk levels were based on historical and anecdotal data, as well as input from the

TABLE 5.46: SUMMARY OF QUALITATIVE ASSESSMENT

HAZARD	CATEGORY/DEGREE OF RISK				
	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION
Floods (100-Year)	Highly Likely	Catastrophic	Moderate	More than 24 Hours	More than 1 Week
Floods (Storm Surge)	Likely	Catastrophic	Moderate	More than 24 Hours	Less than 24 Hours
Sea Level Rise and Land Subsidence	Highly Likely	Critical	Moderate	More than 24 Hours	More than 1 Week
Hurricanes and Tropical Storms	Likely	Catastrophic	Large	More than 24 Hours	Less than 24 Hours
Severe Thunderstorms and Hail	Highly Likely	Minor	Large	Less than 6 Hours	Less than 6 Hours
Lightning	Highly Likely	Limited	Small	Less than 6 Hours	Less than 6 hours
Tomadoes	Likely	Critical	Small	Less than 6 Hours	Less than 6 Hours
Winter Storms and Nor'easters	Likely	Critical	Large	More than 24 Hours	Less than 1 Week
Shoreline Erosion	Likely	Minor	Small	More than 24 Hours	More than 1 Week
Earthquakes	Unlikely	Minor	Large	Less than 6 Hours	Less than 6 Hours
Droughts	Possible	Minor	Large	More than 24 Hours	More than 1 Week
Wildfires	Highly Likely	Minor	Small	Less than 6 Hours	Less than 24 Hours
Dam Failures	Unlikely	Critical	Small	Less than 6 hours	Less than 24 Hours
Tsunamis	Unlikely	Catastrophic	Moderate	Less than 6 Hours	Less than 6 Hours
Extreme Heat	Possible	Minor	Large	More than 24 Hours	Less than 1 Week
Mosquito Borne Diseases	Possible	Limited	Small	More than 24 hours	More than 1 week
Hazardous Materials Incidents	Highly Likely	Critical	Small	Less than 6 hours	Less than 24 hours
Urban Fires	Likely	Limited	Small	Less than 6 hours	Less than 6 hours
Terrorism	Possible	Critical	Moderate	Less than 6 hours	Less than 6 hours
Biological Threats	Possible	Critical	Moderate	Less than 6 hours	More than 1 Week
Radiological Threats	Unlikely	Critical	Moderate	Less than 6 hours	More than 1 Week

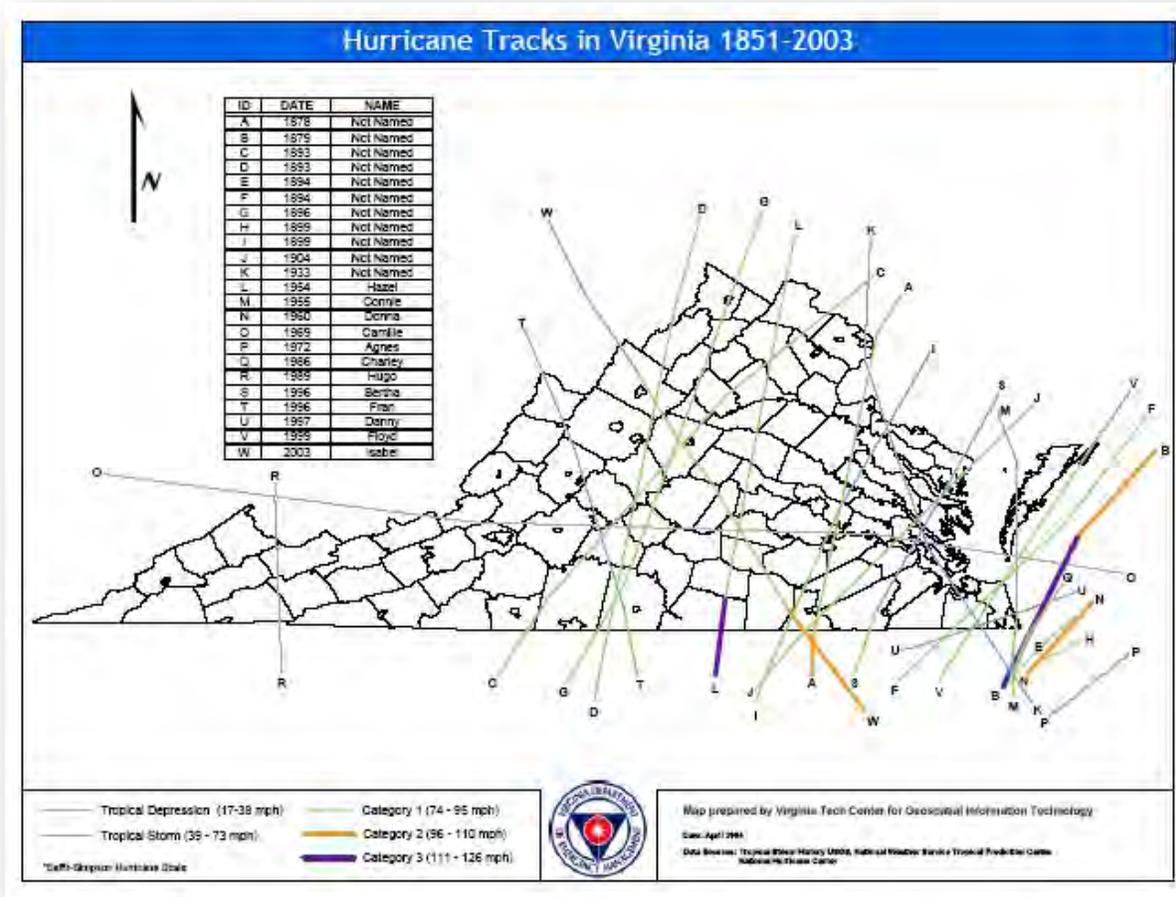
Source: Southside Hampton Roads Mitigation Planning Committee

Mitigation Planning Committee. The results were then used to calculate PRI values and make conclusions for the qualitative assessment.

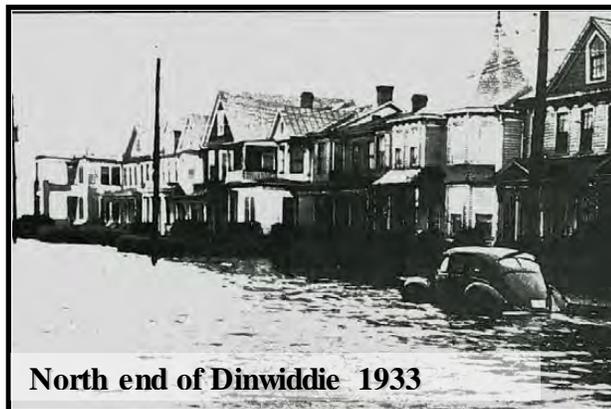
Table 5.46 shows the threat of flooding to the region, including Portsmouth, exists all year round. The threat of flooding, resulting from storm surge associated with winter/spring coastal storms and summer/fall hurricanes and urban flooding due to severe thunderstorms, have probabilities ranging from “Possible” to “Highly Likely”. Also, the city’s relatively low elevations and limited drainage gradient result in non-tidal related flooding of streets and private property located within and outside the floodplains.

Portsmouth’s Flooding History

Portsmouth and the Hampton Roads region have witnessed a number of hurricanes and coastal storms over the past 400 years. Possibly the most famous occurred in October 1749. The Bay rose to fifteen feet above normal, destroying waterfront buildings and reshaping a portion of Norfolk’s Chesapeake Bay shoreline by creating a spit of land (NOAA) approximately two miles long and a quarter mile wide. This area is known as Willoughby Spit in the city of Norfolk and has since become a substantial residential area.



The 20th and 21st century, thus far, have produced ten of the highest recorded water levels as recorded at the NOAA Sewells Point Gauge. The greatest of these storms, the **Chesapeake/Potomac Hurricane of August 23, 1933**, and currently the flood of record, occurred on August 23, 1933 (line K on the Hurricane Tracks in Virginia map) and resulted in the highest recorded tides in history at 6.4' NAVD88. Seventy years later,



North end of Dinwiddie 1933

Hurricane Isabel would record a surge of 6.27' NAVD88 at the Sewells Point Gauge). While this storm included minimal rainfall (1.24 inches in 24 hours), the storm surge produced by the storm coincided with the astronomical high tide, thus resulting in severe flooding. Most of downtown Portsmouth and other low-lying areas were under water. There was severe wind damage to many buildings and flood damage to many wharves and docks in the harbors.

	Ten Highest Water Events	Date	FT(NAVD88)
1	The Chesapeake/Potomac Hurricane of August 23, 1933	8/23/1933	6.407
2	Hurricane Isabel	9/18/2003	6.276
3	Nor' Ida	11/12/2009	6.063
4	Hurricane Irene	8/28/2011	5.925
5	Ash Wednesday Storm	3/7/1962	5.607
6	Hurricane Sandy	10/29/2012	5.148
7	Unnamed Hurricane	9/18/1936	5.105
8	Nor'easter	11/22/2006	5.043
9	Winter Storm	2/5/1998	4.957
10	Unnamed Storm	4/27/1978	4.797

http://tidesandcurrents.noaa.gov/est/est_station.shtml?stnid=8638610

Hurricane Isabel was responsible for over 320 claims for flood losses being filed in Portsmouth. These flood losses had a total value of approximately 3.4 million dollars. Isabel arrived in Portsmouth as a strong tropical storm/weak category 1 hurricane on September 18, 2003. While this storm was considered by many a weak system, it produced flooding conditions less than 1 foot of 1933 storm. In addition to the flooding conditions, extensive tree damage occurred throughout Portsmouth. The hardest hit neighborhoods included Cavalier Manor and Churchland.

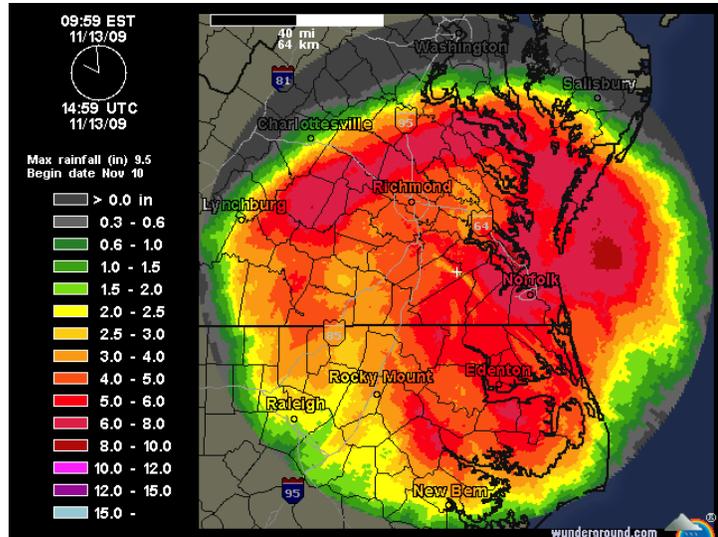
On November 11, 2009, the remnants of Tropical Storm Ida combined with a series of fronts to produce an extremely strong northeast storm, that became known as **Nor' Ida** and would remain over the area for the next five days. Because of the continuous piling on of high tides without release, the final tides on Friday, November 13, 2009 exceeded the flood levels of the Ash Wednesday storm, in March 1962 and were within 6 inches of the Chesapeake/Potomac Hurricane of August 23, 1933. The chief factors that caused the damages of this storm to be so

great were:

1. The reoccurring tides over a 4 day period
2. The tremendous amount of rain Nor' Ida dumped over the coast added to the storm surge.

Final damage figures for buildings alone are estimated to be over \$7,000,000.00. To date 120 property claims for flood damage are known to be paid as this is the increase in RL structures because of the storm.

This radar image shows rainfall totals that affected the area during this storm. Radar- estimated rainfall from the Norfolk radar shows a large area of 4 - 5 inches of rainfall over coastal Virginia and North Carolina.



Hurricane Irene affected the Mid-Atlantic region between Saturday, August 27th and Sunday, August 28, 2011, creating water levels similar to Hurricane Isabel in Hampton Roads (National Hurricane Center, 2011).

Another benchmark storm, and one often referred to by longtime residents, is a coastal storm in March 1962 known as the **Ash Wednesday Storm**. This storm, like the one in 1933, produced relatively small amounts of rainfall (2.25 inches in 48 hours). However, the storm's track and slow movement resulted in a prolonged storm surge that inundated downtown Portsmouth. The flooding occurred when the winds did not allow the release of five tide cycles.



Hurricane Sandy will long be remembered for its devastating effects in Connecticut, New Jersey and New York. After crossing Jamaica, the storm paralleled the East Coast, before being funneled to the northwest by a trough sitting over the southeast. (NOAA, 2013) The tide gauge at Kings Point, NY recorded a crest of 14.31 feet. As large and devastating as the storm surge was, it was not the largest crest. The



Great New England Hurricane of 1938 caused a record crest of 16.75 feet. Except for communities like Saxis Island in Accomack County, Virginia was largely unscathed, recording storm surges approximately 4 feet. The storm serves as a reminder that large storms can impact the Northeast and it does not take a large category of storm to cause widespread, devastating impacts. For a chronological list of storms, please see Appendix D.

Of the ten major tidal flooding events that have occurred in Portsmouth, eight occurred between August and October, corresponding to the Atlantic hurricane season. The remaining two storms were late winter/early spring nor'easters. Four storms were unnamed suggesting that it does not take a large tropical storm or hurricane to produce damaging flood waters.

In fact, flooding can occur from heavy precipitation in a short period of time. Heavy downbursts can cause storm water to accumulate faster than it can drain, leaving motorists stranded, bring travel to a standstill and causing property damage.

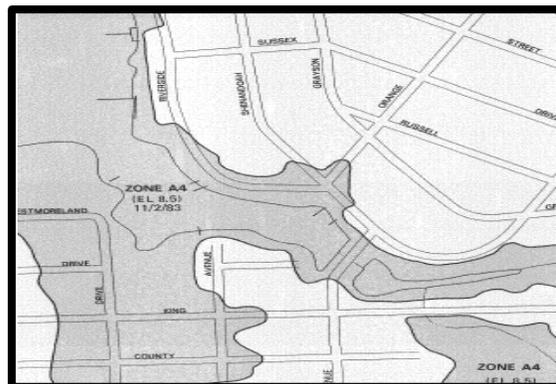


While Portsmouth remains vulnerable to storms, many of the city's characteristics such as density development patterns, street patterns have changed, flood mitigation has been implemented in some areas and regulations have been developed to improve the resiliency of the City. The next section discusses the evolution of floodplain regulations in Portsmouth.

Floodplain Regulations Development

The initial Flood Insurance Study for Portsmouth was published in May 1971. An interim Flood Insurance Rate Map (FIRM) was published July 1, 1974 to change flood zone designations. FIRMs were updated in November 25, 1975 to reflect curvilinear flood boundaries and to add Special Flood Hazard Areas.

A supplemental Flood Insurance revision was published on May 2, 1983, with new FIRMs in November 2, 1983. The study included the effects of wave action for the Hampton Roads area at the confluence of the Elizabeth and James River and established Base Flood Elevations (BFE) ranging from 8.5' – 9' National Geodetic Vertical Datum (NGVD) along tidal rivers and streams within the city.



By overlaying the 1983 FIRMs on parcel boundaries, it was estimated that approximately 1/3 of properties, or 9,900 parcels, in the City were partially or wholly in a Special Flood Hazard Area or Flood Hazard District. The areas most impacted by floodplains and other storm related hazards such as wind and wave damage were the residential areas along the Elizabeth River (southern and western branches), Paradise Creek, Baines Creek and Scott's Creek.

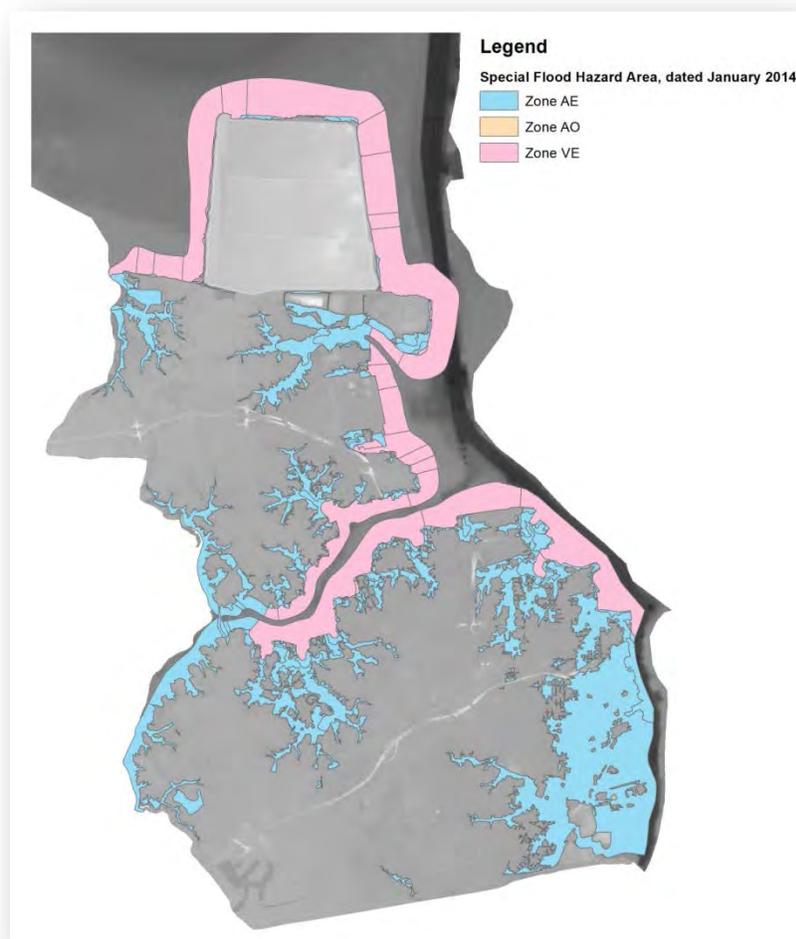
In support of FEMA's Map Modernization, a multi-year effort to improve accuracy and develop digital FIRMs or DFIRMs, the Special Flood Hazard Areas depicted on the 1983 FIRMs, were converted from NGVD to North American Vertical Datum of 1988 (NAVD88) and redelineated, or redrawn, using available contours, dated 1995, provided by the City. The FIRMs became effective September 25, 2009. The hydrologic and hydraulic analyses, depicted on the 1983 FIRMs, was not updated with the newer contours, therefore, the boundaries separating BFEs and zones, such as VE and AE were relatively unchanged.

A comparison 1983 and 2009 FIRMs identified approximately 1,500 parcels added and 1,200 parcels removed from the Flood Hazard District with approximately, 6,500 parcels touched by the Special Flood Hazard Area.

In response to the updated FIRMs, flood regulations were updated to reference the adoption of the new FIRMs and amended to:

- Eliminate term "Mangrove" from the regulations
- Eliminate term "floodway" from the regulations as FIRMs within the city do not contain "floodways"
- Prohibit storage of petroleum products or hazard materials in hazard districts
- Add 1.5 foot "freeboard"
- Add regulations for "repetitive loss structures"

In the fall of 2009, FEMA initiated a coastal analysis and mapping study for coastal communities in Virginia, including the city of Portsmouth, to obtain a better estimate of coastal flood hazards and risk using newer technology, storm records and elevation data. The preliminary FIRMs for the City of Portsmouth were published January 13, 2014 and resulted in approximately 8,300 parcels being included with the Special Flood Hazard Area.



The preliminary FIRMs include a larger coastal high hazard zone area or Zone VE. Zone VE includes areas that experience waves of 3 feet or greater. The coastal analysis revealed that waves could translate further upstream in the Elizabeth River and its tributaries than previously depicted. The additional wave action can cause BFEs in some parts of the city to differ from the previous study by 3 feet or more. The additional BFE, especially within low, flat areas, can increase the floodplain substantially. A new feature on the preliminary maps is the Limit of Moderate Wave Action or LiMWA line. The LiMWA represents the landward extent of where waves of 1.5 to 3 feet, otherwise known as the Coastal A Zone, may be expected during a 1% annual chance event. Post disaster field visits have consistently shown that wave action of as little as 1.5 feet can cause significant damage to structures built in the coastal zone. FEMA recommends V Zone standards for structures within Coastal A Zones, prohibiting structural fill

and requiring structures to be on pilings or piers. This higher standard will assist in reduced property damage and potentially, lower flood insurance premiums. The LiMWA and Coastal A Zone also serve as an opportunity to increase citizen awareness of the potential for increased damage caused by waves within the Coastal A Zone. For more information regarding the importance of the LiMWA line, please see Appendix E.

In response, the flood regulations will be updated to reference the adoption of the new FIRMs and amended to:

- Increase the 1.5 foot freeboard to 3.0 foot
- Define the Coastal A Zone as the landward area between the V Zone and the LiMWA line
- Buildings and structures within this zone shall comply with V zone standards with the lowest supporting member elevated to or above the base flood elevation plus 3.0 feet of freeboard, and must comply with the provisions in paragraph b 2 in this section (14.1-11) (provisions for zones AE or AH) and paragraphs a and d in this section (14.1-11)

To assist citizens in learning about and determining their flood risk, the city of Portsmouth has created a website that includes flood zone information, interactive maps for effective and preliminary maps and regulations governing construction in a floodplain. The link to the site is <http://www.portsmouthva.gov/dna/flood-program.aspx>

State and Local Flood Risk Management Activities

Historically, flood risk management in the Commonwealth of Virginia has been managed by two agencies, Virginia Department of Conservation and Recreation (DCR) and the Virginia Department of Emergency Management (VDEM). DCR manages the NFIP in the Commonwealth and VDEM manages emergency response and mitigation. DCR also establishes the minimum standard floodplain ordinance within the Commonwealth. In response to the new LiMWA line on the FIRMs, the new floodplain ordinance includes a minimum of 1 foot of freeboard within the Coastal A Zone. Local governments may elect to establish higher standards to further reduce the risk. As discussed above, the City of Portsmouth will now require V Zone Construction standards in the Coastal A Zone, as recommended by FEMA and 3 feet of freeboard above the BFE.

In 2013, the Virginia Institute of Marine Science published *Recurrent Flooding Study for Tidewater Virginia*, identifying strategies for adaptation to prevent recurrent flooding in Tidewater and Eastern Shore Virginia localities, at the request of Senate Joint Resolution 76. Two key elements within the report are the identification of 1.5 feet of expected sea level rise for the planning horizon of 20 – 50 years and the development of a comprehensive strategy for flood risk management. Representatives from local governments, including staff from the city of Portsmouth, provided information and experience for the report.

Following the recommendations of the VIMS report, the Secure Commonwealth Panel appointed an interagency task force, known as the Recurrent Flooding Subpanel, to further investigate the findings within the VIMS report, prepare for the future, and coordinate and convene various sectors and levels of government. The Subpanel, made up of representatives from federal, state

and local governments, including staff from Portsmouth, academia, private industry and the Hampton Roads Planning District, developed three work groups; Foundations, Outreach and Education and Data/Mapping. In November 2014, the Subpanel presented *Recommendations to the Secure Commonwealth Panel on the issue of Sea Level Rise and Recurrent Flooding in Coastal Virginia* to the Joint Subcommittee on Recurrent Flooding (Subpanel, 2014).

At the conclusion of 2014, the Joint Subcommittee on Recurrent Flooding, a legislative subcommittee established by HJ 16 (2014) and SJ 3 (2014) to formulate recommendations for the development of a comprehensive and coordinated planning effort to address recurrent flooding, considered the recommendations from the Recurrent Flooding Subpanel and guest presenters, including the city of Portsmouth, and identified the following interim recommendations for further review.

I. Topic: Ground water / Outfall ditches

a. Recommendation (groundwater): Initiate a study by JLARC to develop recommendations for a strategy to sustainably and equitably manage the coastal aquifer system in order to maintain its productivity and availability for the long term.

Background: Land subsidence has been identified as a component of recurrent coastal flooding. Over-pumping of groundwater from the coastal plan aquifer system has been identified as a contributor to land subsidence, declining groundwater levels and increasing saltwater intrusion potential.

b. Recommendation (outfall ditches): VDOT shall inventory and record all drainage systems under the responsibility of VDOT. The inventory shall be completed by a specified date and be made available to the public.

Background: The issues of recurrent flooding and inadequate drainage across the lower portions of the Virginia Coastal Zone have become problematic. Both public roadside ditch infrastructure and the interconnected private ditch system have failed, causing losses to private property and public infrastructure.

II. Topic: Real estate disclosure

Recommendation: As part of required disclosures, advise purchasers to exercise due diligence, including obtaining a flood certification and a lender determination of whether the property is located in a flood zone and whether flood insurance is required.

Background: These changes would ensure that potential buyers are identifying issues and getting the most up-to-date information earlier in the real estate transaction.

III. Topic: Floodplain Management Plan

Recommendation: Update the Commonwealth's Floodplain Management Plan.

Background: The Commonwealth's initial Floodplain Management Plan has not

been updated since 2005. With changing circumstances and access to new information, it would be beneficial to have the plan routinely updated and easily accessible by the public in an online format. It was also suggested that the Department of Conservation and Recreation should be encouraged to work with the Joint Subcommittee in seeking input for preparation of the plan update.

IV. Topic: State Resiliency Officer

[The recommendation below was not adopted; rather it is recommended that the Governor create such a position.]

Recommendation: Designate a State Resiliency Officer.

Background: As with any program or incident, there must be an individual identified as the lead in order to give direction and ensure accountability. Any resiliency coordinator should be closely aligned with the Secure Commonwealth Panel, and, in order to better assure consistency and continuity, the Commonwealth should consider creating a full-time career position.

V. Recurrent Flooding Resiliency Fund

Recommendation: Create or authorize the Recurrent Flooding Resiliency Fund, a low-interest loan program that will help residents who are subject to recurrent flooding.

Background: Connecticut has created a similar program that provides loan assistance to homeowners and business owners located in flood-prone areas. In the Connecticut plan, funds can be used to elevate or flood-proof primary and secondary single homes, one-unit to four-unit owner-occupied rentals, and businesses. The funds will be available to some property owners who are ineligible for federal assistance.

Legislation has been introduced to address real estate disclosure, an update to the Commonwealth's Floodplain Management Plan, the establishment of a state resiliency officer and a recurrent flooding resiliency fund.

Additionally, as of July 1, 2015, any locality in the Hampton Roads Planning District Commission shall incorporate into its next scheduled and all subsequent reviews of its comprehensive plan strategies to combat projected relative sea level rise and recurrent flooding as required by Senate Bill 1443.

Floodplain Management Financial Aspects

Living or working in a floodplain has many challenges. The financial aspect requires specific discussion. The majority of Portsmouth was developed prior to the city entering the National Flood Insurance Program and mandatory flood risk construction regulations were developed. Of the approximately 8,300 parcels that are wholly or partially in the Zone AE flood hazard zone (as shown on the preliminary Flood Insurance Rate Maps for the city of Portsmouth, Virginia, dated January 13, 2014) with buildings valued at over \$1,000.00 approximately 73% of the properties were constructed before the City adopted floodplain management regulations.

*Note: the Zones AE and VE identify properties that have at least a 1% annual chance of receiving flood damages during a 100 year period.

For private citizens and business owners, the financial question involves two components; insurance premiums and damages from flooding events. For the local government, this question of floodplain management can be divided into two areas; general budget and grants.

Insurance Premiums

The National Flood Insurance Program establishes the premium fees for policies. Therefore, the yearly cost of the policy should be the same regardless of the company. For more information, visit www.floodsmart.gov or speak to a flood insurance agent.

There are currently three main types of policies available. These policies are for buildings located outside of a flood hazard district, buildings located partially or wholly in a flood hazard district and recently added is a policy for those properties that are listed in a hazard district due to a recent map change.

Buildings located outside the Special Flood Hazard Area, or 1% annual chance floodplain, and have not experienced a flood, are considered a lower risk.

Policies for buildings located partially or wholly in a flood hazard district are further divided into two subgroups. These subgroups are "Pre-firm" and "Post-firm". Pre-firm policies are prepared for those buildings built prior to the date the community entered the Flood Insurance Program and adopted local floodplain regulations. Post-Firm policies are prepared for buildings constructed after regulations were adopted. Generally, the rates for complying post-firm policies are less than pre-firm policies due to reduced risk. A pre-firm property owner can have their property considered for post-firm rates by submitting an elevation certificate from a private surveyor. However, if the building has experienced flood damage, floor level is below the BFE, the building has a basement below BFE or the vents in the foundation are not the correct size or material no adjustment will be made.

Flood Damages

Flood damages affect both the building and contents of the building. Insurance will not provide a full replacement of everything damaged. Flood insurance policies typically do not cover pictures, crafts and the like. Policies also carry a deductible that reduces the amount that can be collected after a loss. Coverage types and limits are available through an insurance agent. If the building is damaged more than 50% of the market value, cumulatively during a ten year period from flood events, then the structure is declared substantially damaged and the repairs must include actions to bring the structure into full compliance with the current regulations. This level of damage requires the building to be classified as “Substantially Damaged”.

Grants

There are four basic grants that the Federal Emergency Management Agency (FEMA) and or the National Flood Insurance Program sponsor. All but the ICCC are competitive grants and have very specific guidelines and deadlines that must be met to be considered. Likewise, only the ICCC grant can be applied for by the homeowner. The application for all others must be coordinated through the city of Portsmouth to the Commonwealth of Virginia. All grants require that all persons/property receiving a benefit must maintain a Flood Insurance Policy. The purpose of this section is not to provide a detailed description of all grants available but to list grants so the home or business owner can seek more information.

ICCC (Increased Cost of Compliance Construction)

The Increased Cost of Compliance Construction claims payments are only available to flood-related damaged properties that have been declared substantially damaged or are RL structures. These funds are to be used to elevate, relocate, or demolish a residential structure or flood proof nonresidential structures. The coverage is available regardless of whether the flood results in a Presidential disaster declaration or not. There is a maximum payout of \$30,000.00 with this program. Additional funds necessary to complete the project are the responsibility of the property owner. Additional guidance can be obtained from FEMA publication FEMA P-301.

HMGP (Hazard Mitigation Grant Program)

The Hazard Mitigation Grant Program (HMGP) provides grants to State and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

FMA (Flood Mitigation Assistance)

The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).

FEMA provides FMA funds to assist States and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the National Flood Insurance Program.

PDM (Pre-Disaster Mitigation)

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event.

Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

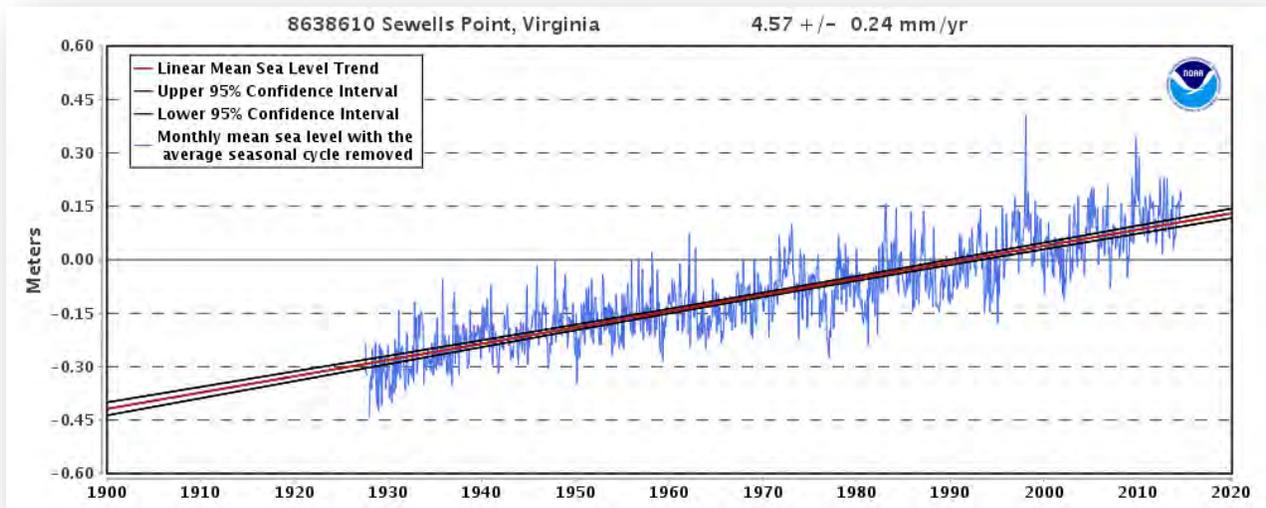
ONE IMPORTANT NOTE THAT NEEDS TO BE REMEMBERED: FEMA IS NOT HERE TO BAIL YOU OUT. YOU MUST HAVE A FLOOD INSURANCE POLICY THIRTY DAYS BEFORE THE FLOODING EVENT BEFORE AN INSURANCE CLAIM CAN BE FILED OR ANY GRANTS CAN BE APPLIED FOR.

For more information regarding flood insurance, damages, grant programs and additional helpful links, please see Appendix F.

Relative Sea Level Rise

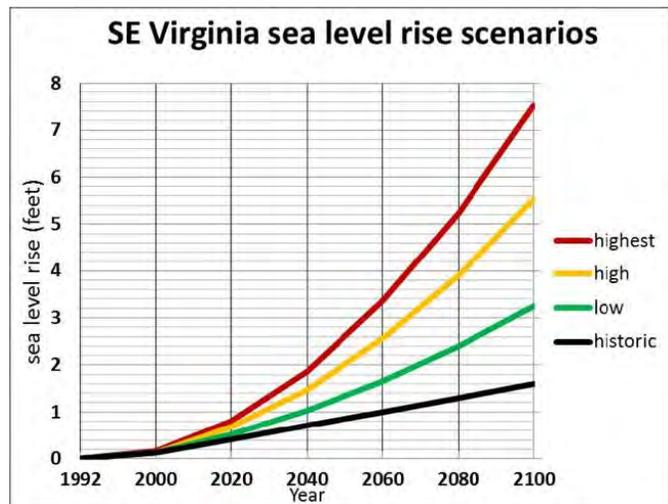
When the city of Portsmouth was founded approximately 400 years ago, the Chesapeake Bay and James and Elizabeth Rivers were major contributors to the success of the new settlement. The waterways provided a cheap and efficient form of transportation, a wealth of food items including fish, crabs and oysters, and the potential for economic development through ship building and repair. However, the benefits that helped secure Portsmouth's growth, provided jobs, scenic views and recreation threaten to damage valuable waterfront property.

Exacerbating the effects of coastal storms is rising sea level. Globally, sea level is rising, on average, 1.7 – 1.8mm/year due to factors including an increase in water volume and mass in the world's oceans (Boon, 2010). According to the *Climate Change Impacts in the United States*, global climate is changing and is projected to continue to change over this century and beyond. Global sea level has risen about 8 inches since 1880 and is projected to increase another 1 to 4 feet by 2100. (U.S. National Climate Assessment, 2014).

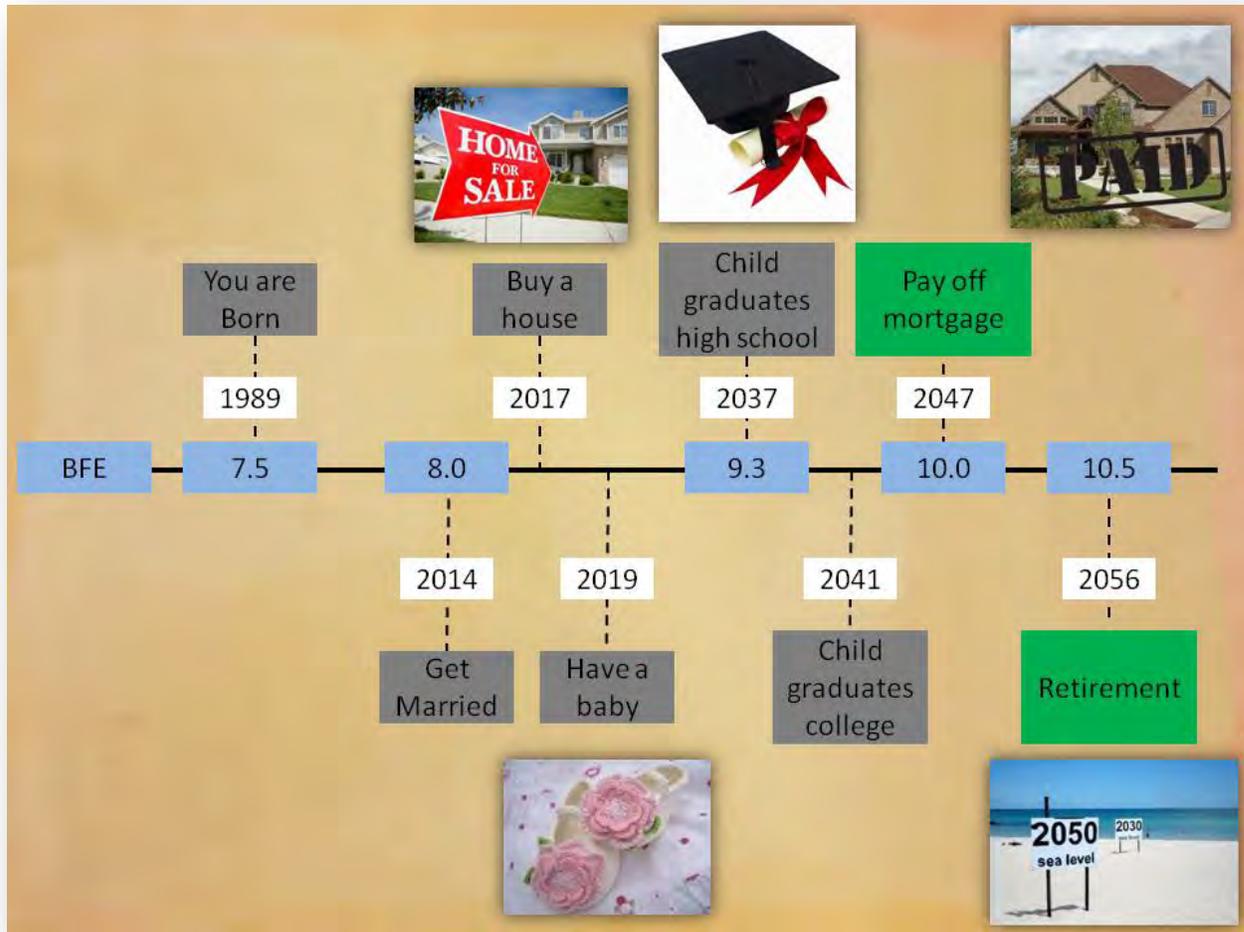


The impact of global sea level rise can vary by location. Relative sea level rise refers to the change in sea level relative to the elevation of the land, which includes global sea level rise, land subsidence and changes in ocean circulation (Titus, 2010). In areas where land is subsiding or sinking, such as along the Mid-Atlantic and Gulf Coasts, relative sea level is rising more quickly. At the NOAA tidal gauge located at Sewells Point, a mean sea level trend of 4.57 mm/year has been recorded (or equivalent to 1.46' of change over 100 years).

In 2012, in response to the threat of relative sea level rise to coastal Virginia, including vulnerable Norfolk – Virginia Beach Metropolitan area and the world’s largest naval base, Naval Station Norfolk, the Virginia General Assembly requested the Virginia Institute of Marine Science study strategies for adaptation for recurrent flooding in Tidewater and Eastern Shore localities. For planning purposes, the report references four sea level rise scenarios identified in the National Climate Assessment. (Virginia Institute of Marine Science, 2013). In support of near term



construction and mitigation activities, the report recommends the use of 1.5' of anticipated sea level rise for the planning horizon of 20 – 50 years. (Virginia Institute of Marine Science, 2013). While climate science continues to improve, uncertainty causes long term future sea level projections to diverge, causing significant differences in projections and making effective planning for sea level rise challenging for local governments. Visualizing sea level rise in 2100 can be quite challenging for residents. Sea level rise projections, however, can be applied to everyday life by selecting milestone dates along the sea level rise curve.

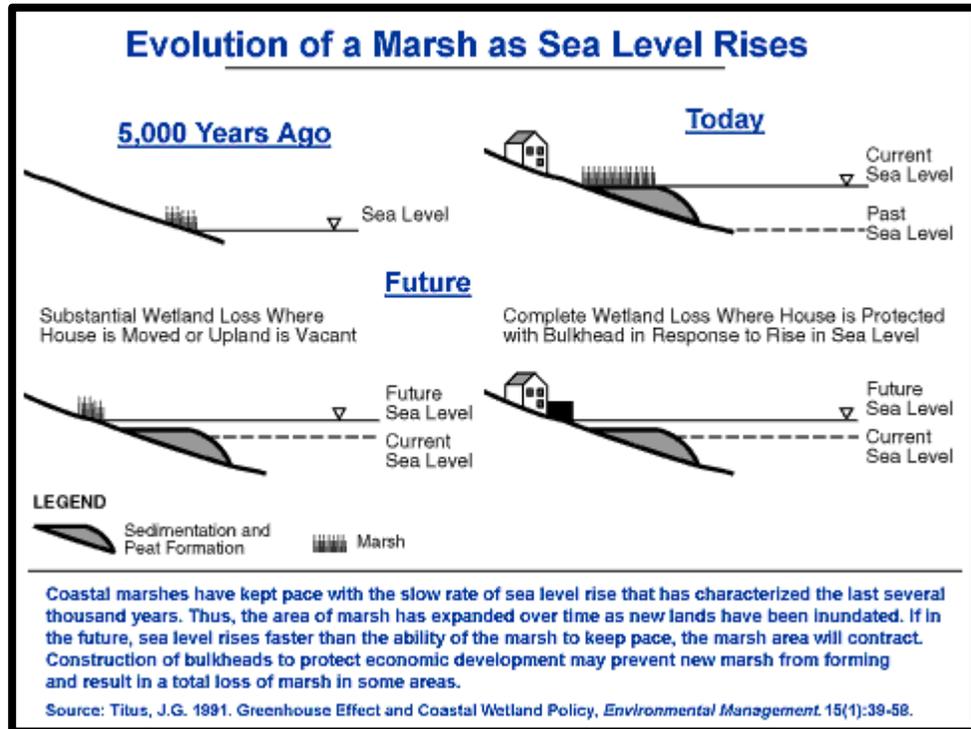


Rising sea levels inundate wetlands and other low-lying lands, erode beaches, intensify flooding, and increase the salinity of rivers, bays, and groundwater tables. Some of these effects may be further compounded by other effects of a changing climate. Additionally, measures that people take to protect private property from rising sea level may have adverse effects on the environment and on public uses of beaches and waterways. Some property owners and state and local governments are beginning to take measures to prepare for the consequences of rising sea level.

Land Loss

Coastal wetland ecosystems, such as salt marshes are particularly vulnerable to rising sea level because they are generally within a few feet of sea level (IPCC, 2007). Wetlands provide habitat for many species, play a key role in nutrient uptake, serve as the basis for many communities' economic livelihoods, provide recreational opportunities, and protect local areas from flooding.

As the sea rises, the outer boundary of these wetlands will erode, and new wetlands will form inland as previously dry areas are flooded by the higher water levels. The amount of newly created wetlands, however, could be much smaller than the lost area of wetlands,



especially in areas where retreat is limited by bulkheads, dikes, and other structures. The IPCC suggests that by 2080, sea level rise could convert as much as 33 percent of the world's coastal wetlands to open water. (IPCC, 2007). Tidal wetlands are generally found between sea level and the highest tide over the monthly lunar cycle. As a result, areas with small tide ranges and therefore, smaller areas of wetlands are the most vulnerable. An EPA Report to Congress estimated that a two foot rise in sea level could eliminate 17-43 percent of U.S. wetlands, with more than half the loss taking place in Louisiana (EPA, 1989). In addition to serving as a vital habitat for wildlife, wetlands provide water quality benefits by removing nutrients, reduce erosion and provide protection against storm surge.

Nationwide, about 5,000 square miles of dry land are within two feet of high tide. Although the majority of this land is currently undeveloped, many coastal counties are growing rapidly. Land within a few feet above the tides could be inundated by rising sea level, unless additional dikes and bulkheads are constructed. A two foot rise in sea level would eliminate approximately 10,000 square miles of land, including current wetlands and newly inundated dry land, an area equal to the combined size of Massachusetts and Delaware (EPA, 1989).

A map of the areas within the City that could be inundated with sea level rise of 0-2 feet, 2-4 feet and 4-6 feet is provided in the Appendix G. Using this mapping the following land area would be lost within the city of Portsmouth:

- A. 0-2 feet sea level rise equals 1.4 square miles or 5% of city's land area
- B. 2-4 feet sea level rise equals 2.1 square miles or 7% of city's land area
- C. 4-6 feet sea level rise equals 3.6 square miles or 12% of city's land area
- D. 6-8 feet sea level rise equals 7.0 square miles or 24% of the city's land area

Storms and Flooding

Sea level rise increases the vulnerability of coastal areas to flooding during storms for several reasons. First, a given storm surge from a hurricane or northeaster builds on top of a higher base of water. Considering only this effect, a Report to Congress by FEMA (1991) estimated that existing development in the U.S. Coastal Zone would experience a 36-58 percent increase in annual damages for a 1-foot rise in sea level, and a 102-200 percent increase for a 3-foot rise. Shore erosion also increases vulnerability to storms, by removing the beaches and dunes that would otherwise protect coastal property from storm waves (FEMA 2000). Sea level rise exacerbates flooding from rain by filling stormwater outfalls, slowing drainage of low areas.

Other impacts of climate change may further enhance or mitigate coastal flooding. Flooding from rain may become worse if warmer temperatures lead to increasing rainfall intensity during severe storms. An increase in the intensity of tropical storms could increase flood and wind damages.

Using the generalized mapping for sea level rise discussed in the above section it is estimated if a sea level rise of 6 feet were to occur, and therefore, increase the BFE by 6 feet, approximately 65% of the City would be located in a flood hazard area.

Responses to Sea Level Rise along the Coast

Property owners and federal, state, and local governments are already starting to take measures to prepare for the consequences of rising sea level. Most coastal states are working with the U.S. Army Corps of Engineers to place sand onto their beaches to offset shore erosion. Property owners are elevating existing structures in many low-lying areas, encouraged by lower flood insurance rates.

Several states have adopted policies to ensure that beaches, dunes, or wetlands are able to migrate inland as sea level rises. Some states prohibit new houses in areas likely to be eroded in the next 30-60 years (e.g. North Carolina Coastal Resources Commission). Concerned about the need to protect property rights, Maine, Rhode Island, South Carolina and Texas have implemented some version of "rolling easements," in which people are allowed to build, but only on the condition that they will remove the structure if and when it is threatened by an advancing shoreline (Titus, 1998).

Repetitive Loss Properties

A Repetitive Loss (RL) Structure is a structure that has suffered flood damage on two or more occasions during a 10-year period. These RL structures nationwide account for approximately 2% of the insured properties but have received over 40% of the claims paid.

As of November 2014:

- There have been 1422 flood insurance for a total of **\$13,847,168.22**
- There are 220 parcels that were considered RL.

Appendix H contains maps of general areas of RL. The identification process of repetitive loss areas supports a goal within the Floodplain Management Plan to protect public citizens from the life threatening hazards associated with flooding.

1. Identify the properties that are situated near repetitive loss structures and advise them of their increased at-risk status.
2. Identify the causes of the flooding and, as funding is available, address solutions that provide the highest return.
3. Notify the property owners of programs that may reduce their risk status.

Goals, objectives and activities will be discussed in greater detail in Chapter 5. The following flood planning programs will address each of these goals with a range of activities, which will improve general public information on the various aspects of flood prevention and mitigation. In addition this section will increase the level of regulatory review in regards to existing development in the repetitive loss portions of the floodplains, and provide and various public improvements, which will lessen future flood damage.

In late June of 2010, the city of Portsmouth received a listing of the repetitive loss properties that through June 1, 2010 had claims paid for the 2009 Nor'easter. This storm alone caused the number of repetitive loss structures to increase from 18 properties to 60 properties.

The following is a listing of claims by neighborhood:

Olde Towne	65	Pine Acres	2
Westhaven	25	Truxtun	2
Cradock	15	West Norfolk	1
Simonsdale	9	Sterling point	1
Port Norfolk	8	Turnpike Corridor	1
Park View	7	Prentis Park	1
Oregon Acres	7	Cedar Point	1
Pinehurst/Green Acres	6	Prentis Place	1
Brighton	6	Park Manor	1
West Park View	5	Westbury	1

Swimming Point	4	Olde Towne South	1
Wise Beach	4	Not in a neighborhood	4
Waterview	3		

The statewide average for this storm exceeded \$15,500 per claim.

One major modification assists in reducing the number of repetitive loss structure in the future is the modification of the definition of “Substantial Damage”. This new code requirement now reads **“Substantial damage** means damage of any origin sustained by a structure when the cost of



restoring the structure to its pre-damage condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. **A structure that has been damaged by flood events two or more times during any consecutive 10 year period with a cumulative building loss equal to or exceeding 50 percent of the market value of the building shall also be considered a substantial damaged structure.”** Through the use of this new definition substantial damaged structures may now be addressed in a more comprehensive manner that at any time in the past. Maps of the repetitive loss areas are included in the Appendix G. Because of confidentiality regulations, a listing of the specific properties and their claims cannot be published.

Severe Repetitive Loss Structures

The definition of Severe Repetitive Loss (SRL) as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C.4102a. A SRL property is defined as a **residential property** that is covered under an NFIP flood insurance policy and:

- (a) That has at least four NFIP claim payments (including building and content) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any

ten-year period, and must be greater than 10 days apart.

The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning- Bereuter- Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP).

Purpose: To reduce or eliminate claims under the NFIP through project activities that will result in the greatest savings to the National Flood Insurance Fund (NFIF).

Federal/Non-Federal cost share: 75/25 %; up to 90% Federal cost-share funding for projects approved in States, Territories, and Federally-recognized Indian tribes with FEMA-approved Standard or Enhanced Mitigation Plans or Indian tribal plans that include a strategy for mitigating existing and future SRL properties.

Should the city of Portsmouth participate in a grant to reduce the number of Severe Repetitive Loss Structures and the property owner declines participation of the Mitigation Offer of Assistance, FEMA will issue a Notice of NFIP Insurance Premium Rate Increase to the property owner specifying the effective date of the insurance premium rate increase for the property. Generally, this increase will occur upon renewal of the insurance policy.

As of June 2014, there are 12 SRL properties in the city of Portsmouth, representing a 33% decrease from 18 properties in 2009.

5. SET GOALS

The goals of the Floodplain Management Plan can be summarized in the following statements:

1. Protect citizens from the life threatening hazards associated with flooding.
2. Protect public and private property from damage relating to flooding.
3. Provide for optimal use and enjoyment of public and private property while maintaining the greatest level of flood protection possible.

The Floodplain Management Plan addresses each of these goals through associated objectives and activities, which will improve public information on the aspects of flood prevention and mitigation, increase the level of regulatory review for new development in floodplains, and provide for public improvements, to reduce future flood risk and improve the City's resiliency to flood damage.

Given the importance of port functions to the city, the general development pattern in place, and the recreational and economic needs for waterfront access, the majority of floodplain management activities will revolve around mitigating flood losses and hazards to existing development. Mitigation activities could include higher standards for new development, and instituting programs and projects that will reduce flood risk throughout the city.

There may be opportunities for acquiring land in floodplains for public recreational use over time, but acquisition will not be a primary floodplain management focus due to the expense of purchasing developed properties. However, the plan will encourage preserving and maintaining undeveloped public lands within the floodplain from future development. In the same way, because recreational use of the waterfront has been established and will be maintained as a city policy, flood risk reduction activities that reduce public access to the waterfront, such as floodwalls or other structures, are not considered viable options at this time. Instead, the plan will encourage projects that provide adequate flood protection while allowing public access and use of the waterfront. The objectives, numbered according the goal it supports, will be presented, along with specific activities, in the following section.

General

1. Objective 1.1: Promote flood hazard risk awareness and inform citizens of the City's participation in the National Flood Insurance and Community Rating System Programs.
2. Objective 1.2: Support a comprehensive approach to floodplain management.
3. Objective 2.1: Provide information to all property owners in Portsmouth regarding methods to reduce flood damage through a variety of media.

Economic Development

1. Objective 1.3: Include Floodplain Management in all facets of economic Development
2. Objective 2.2: Determine actions that provide protection from storm water and surge flooding thus increasing the value of properties.
3. Objective 3.1: Maintain physical and visual links between downtown and waterfront.
4. Objective 3.2: Evaluate and promote construction methods and best management practices to promote flood resiliency within the maritime community.
5. Objective 3.4: Coordinate with programs and policies in all City departments to develop, promote and manage a greenway and open space preservation program throughout the city, which provides protection to open space and environmentally sensitive areas.

Infrastructure

1. Objective 1.4: Develop methods and materials to aid property owners in modifying and protecting their buildings.
2. Objective 1.4.1: Ensure that substantially improved or new construction complies with elevation requirements and design standards of floodplain regulations.
3. Objective 2.1: Develop policies and regulations that address critical structures and the infrastructure of the City.

Environmental Quality

1. Objective 1.5: Coordinate with other City departments and outside agencies to protect natural environments that reduce flood effects and damages.
2. Objective 1.5.1: Coordinate the production and distribution of educational materials for the general public dealing with environmental issues.
3. Objective 2.4: Manage a flood protection program for those areas threatened by the potential of damaging floodwaters.
4. Objective 2.5: Improve and maintain public access to city waterways including public beaches, parks and other natural areas.
5. Objective 2.6: Protect, enhance, restore and manage wetlands, beaches, forests and other ecosystems including remaining waterfowl and wildlife habitats through the existing TMDL Action Plan required by the MS4 permit.

Repetitive Losses

1. Objective 1.6: Identify the locations and causes of Repetitive Loss and Severely Repetitive Loss Structures and provide methods to reduce future flood damage.
2. Objective 1.7: Continuously investigate financial programs to reduce these and future losses.
3. Objective 2.7: Make certain all aspects of flooding are included in mitigation efforts.

6. DRAFT AN ACTION PLAN

Floodplain Management Plan

In the City of Portsmouth's initial plan, the floodplain management action items were organized around the three basic components:

1. public information,
2. mapping and regulatory review, and
3. flood damage prevention and reduction.

For each of these components an overall goal was presented, supported by a series of policy statements. Along with these policy statements, various activities were listed that, when implemented, contributed to the implementation of the policy. These activities, including timetable and estimated budgetary impacts, were listed with each policy under the heading "Items to Accomplish". The 2010 plan followed a similar format but chose to define the activities in three areas labeled: Past Accomplishments, Continuing Actions and Future Dreams. This section of the 2015 plan will present the future activities in a format that identifies goals, objectives, and finally, a series of activities to implement. These activities will be identified as Past Accomplishments, Continuing Actions and Future Dreams as they were in the 2010 plan thus providing a consistent transition from the 2010 plan while providing a roadmap to better flood plain management.

Past Accomplishments

A good method to evaluate the success of a plan is to compare the action items to accomplishments. Through the diligent efforts of many City departments, the 2010 Flood Plan guided Portsmouth to a point where it was recognized as a leader in flood plain management by its progressive actions even when facing numerous obstacles. The following is a listing of the major accomplishments of that plan:

1. Staff prepared and updated an interactive map on the City's web site that allowed citizens 24 hour access. The mapping application includes: current and past flood zones, elevation contours from 0 to 8 feet, surge analysis for category 1 through 4 storms, and Chesapeake Bay districts.
2. Obtained new preliminary FIRMs from FEMA on January 2014.
3. Adopted new flood plain regulations that:
 - a. Provided 1.5 foot freeboard requirements.
 - b. Created a new definition for substantial damage to facilitate insurance claims and reduce future claims.
 - c. Prohibit bulk hazardous materials from being stored in flood hazard zones.
4. Prepared comprehensive Repetitive Loss Area maps.
5. Updated the Chesapeake Bay regulations to improve coordination with the Floodplain regulations.

Floodplain Management Plan Actions

One very clear result of the initial plan was that many activities needed to be completed in a systematic manner each year. Only through the listing and periodic review and discussion of these activities will the everyday floodplain management issues be improved and continued. The following are those activities that have been identified as needing to continue on a regular basis:

“Mitigation, a cornerstone of emergency management, is defined as taking sustained actions to reduce or eliminate the long-term risks to people and property from hazards. Mitigation builds community resilience and community sustainability.” When a tornado or flood is upon us, it is too late to take mitigative actions; but by taking steps to lower our risk across generations, we can ensure that our communities recover more quickly from those natural events when they do occur. Building our homes and buildings outside of high-risk flood areas; fortifying our schools and hospitals and office buildings against earthquakes; constructing safe rooms for our neighbors, our friends, and our families to shelter in during high wind events are all examples of ways planners, developers, architects, engineers, and community leaders can take those necessary and sustainable actions to protect existing and future development against natural functions of the environment and reduce the need—and cost—for response and recovery after an event occurs.” (Hazard Mitigation: Integrating Best Practices into Planning) Each of these items is to be accomplished as funds are made available.

1. Protect citizens from the life-threatening hazards associated with flooding.

a. General

Objective 1.1: Promote flood hazard risk awareness and inform citizens of the City’s participation in the National Flood Insurance and Community Rating System Programs.

Activity: Public information

- a. Develop a Program for Public Information (PPI). ***IN PROGRESS***
- b. Provide information to the citizens of Portsmouth pertaining to flood risk, regulation requirements, flood insurance and protection measures. ***A CONTINUING ACTIVITY***
- c. Upon request, provide FIRM interpretations for citizens regarding the location of any property in relation to established special flood hazard areas. ***A CONTINUING ACTIVITY***
- d. Create a PPI committee to assist in developing flood risk strategies and outreach ad campaigns. ***A SHORT TERM ACTIVITY***
- e. Promote and pursue state law requiring disclosure of flood hazard to potential property owners during the purchase of a property. ***COMPLETE.***

Activity: Provide opportunities for the dissemination of flood hazard related information to the general public especially those living in flood prone areas.

- a. Website ***A CONTINUING ACTIVITY***
 - i. Develop a website that can provide FIRMs, flood risk information, links to additional information such as floodsmart.gov and <https://www.fema.gov/national-flood-insurance-program>, and methods for

- reducing flood risk. Include **Changes Since Last Firm** to identify the difference between the effective and preliminary FIRM and depth grid to communicate flood risk depth to property owners.
- ii. Maintain the website and check monthly that all links are active.
- iii. Inform all residents of the service on at least a yearly basis.
- b. Brochures **A CONTINUING ACTIVITY**
 - i. Develop a series of brochures and pamphlets to specifically address the needs and concerns of property owners city wide, in the hazard areas, renters and the elderly.
 - ii. Develop a brochure that includes a listing of inexpensive steps property owners can take to reduce flood damage. **A SHORT TERM ACTIVITY**
 - iii. Make brochures available through the website and other media, as available. Provide brochures to real estate and insurance agents.
- c. Mailings **A CONTINUING ACTIVITY**
 - i. Prepare and continually update mailing lists of all interested groups and partners, broken down by location in a hazard zone or not.
 - ii. Annually, prepare mailings to property owners city wide, in the hazard areas, renters and the elderly to advise of at risk status.
 - iii. Prepare mailings to property owners city wide, in the hazard areas, renters and the elderly to advise of changes in mapping and regulatory program.
 - iv. Prepare mailings to property owners city wide, in the hazard areas, renters and the elderly to advise of how to plan for a flooding event based on the individual needs.
 - v. Prepare mailings to property owners city wide, in the hazard areas, renters and the elderly to advise of the benefits of flood insurance.
- d. Presentations
 - i. Realtors
 - ii. Rental Property
 - iii. Civic Leagues
 - iv. Insurance Agents
 - v. Banks
 - vi. Construction and Design Groups
 - vii. Channel 48 (City TV Channel)

Prepare multiple public service announcements and short programs for broadcast to the public. Include in the inventory videos prepared by federal, state and other local governments.

 - vii. Library **A CONTINUING ACTIVITY**
 - i. Continue stocking the library system with flood related books and publicize the activity.
 - ii. Continue to maintain, support and increase the materials maintained in the electronic library.
 - iii. Publicize the materials in the library and on the website.

Objective 1.2: Support a comprehensive approach to floodplain management.

Activity: Include floodplain management in Comprehensive Plan update.

A SHORT TERM ACTIVITY

Activity: Include floodplain mitigation actions in Emergency Preparedness Plan. ***A***

SHORT TERM ACTIVITY

Activity: Include floodplain mitigation actions as a budget consideration.

A SHORT TERM ACTIVITY

Activity: Install USGS gauge on Elizabeth River.



COMPLETED

http://waterdata.usgs.gov/va/nwis/uv/?site_no=02042893&PARAMeter_cd=62620

b. Economic Development

Objective 1.3: Include Floodplain Management in all facets of economic development

Activity: Notify real estate community, lending Institutions, and insurance companies of participation in the National Flood Insurance Program and Community Rating System Program. ***A CONTINUING ACTIVITY***

Activity: Update the Downtown Guidelines and other related documents to contain a section on flooding and specific design criteria. ***A SHORT TERM ACTIVITY***

c. Infrastructure

Objective 1.4: Develop methods and materials to aid property owners in modifying and protecting their buildings.

Activity: Require an elevation certificate to be provided with the “as built survey” prior to the issuance of a certificate of occupancy for all new or substantially improved structures located in a floodplain and in the “AE, AO” and “VE” districts. *A CONTINUING ACTIVITY*

Activity: Provided staff training on the requirements of the National Flood Insurance Program, local floodplain regulations, elevation certificates, flood vents, substantial damage and substantial improvement. *A CONTINUING ACTIVITY*

Objective 1.4.1: Ensure that substantially improved or new construction complies with elevation requirements and design standards of floodplain regulations.

Activity: Review plans for all new construction to insure they meet or exceed the requirements of state federal and local regulations. *A CONTINUING ACTIVITY*

Activity: Develop a checklist that homeowners can use to select a contractor with experience with hazards in the flood zone. *A SHORT TERM ACTIVITY*

d. Environmental Quality

Objective 1.5: Work in a coordinated manner to protect natural environments that reduce flood effects and damages.

Activity: Review current plans and ordinances to coordinate flooding mitigation between Chesapeake Bay Protection Areas, Storm water Regulation, Erosion Sediment Regulations, Wetland regulations and the Zoning Ordinance. *A LONG TERM ACTIVITY*

Objective 1.5.1: Coordinate the production and distribution of educational materials for the general public dealing with environmental issues

e. Repetitive Losses

Objective 1.6: Identify Repetitive Loss and Severely Repetitive Loss Structures locations and causes and provide methods to reduce future flood damage

Activity: Continue to identify all repetitive loss structures within the city.

Activity: Continue to notify owners of all repetitive loss structures of their status and the potential of becoming a substantially damaged structure with the next event.

Activity Review Repetitive Loss areas and identify new repetitive loss properties, sources of flooding and potential mitigation strategies.

Objective 1.7: Continuously investigate financial programs to reduce these and future losses

Activity: Constantly review federal state and local sources for potential funding sources.

Activity: Give priority to funding sources that allow property owners and lenders to deal directly with each other.

2. Protect public and private property from damage relating to flooding.

a. General

Objective 2.1: Provide information to all property owners in Portsmouth methods to reduce flooding damage using a variety of media.

Activity: Prepare an education segment to be aired on the City Channel 48 during the hurricane and Nor'easter storm season.

Activity: Prepare evacuation policies that include actions for disabled individuals.

Activity: Install additional warning signs along flood-prone stretches of road.

Activity: Review "Best Practices" of other communities to remain abreast of current floodplain management activities.

Activity: On a five year basis determine the rate of sea level rise using the most accurate information available and amend plans accordingly.

Activity: Prepare and adopt an overlay zoning district that addresses concerns of sea level rise.

b. Economic Development

Objective 2.2: Determine actions that provide protection from storm water and surge flooding thus increasing the value of properties.

Activity: Identify and fund drainage improvement projects.

Activity: Provide the necessary maintenance to the storm drain system to reduce the potential of flooding from rain or storm events.

Activity: Provide protection from surge flooding for the downtown, Olde Towne, Westhaven and Cradock sections of the city.

c. Infrastructure

Objective 2.3: Develop policies and regulations that address critical structures and the infrastructure of the City.

Activity: Require all requests for homes for the aged, nursing homes, homes for disabled and the like to have an emergency operations plan.

Activity: Prepare infrastructure plans to include sea level rise considerations in budget and construction.

Activity: Create development policies and regulations that prevent critical structures from being located in flood hazard areas.

d. Environmental Quality

Objective 2.4: Manage a flood protection program for those areas threatened by the potential of damaging floodwaters

Activity Determine an expected sea level rise for the next 100 years based on current science. Prepare infrastructure plans utilizing sea level rise as a determining and budget factor.

Activity Map commercial operations that store hazardous materials and that are in the flood hazard areas.

Activity Map streets that routinely flood during rain events. Identify the cause of the flooding and develop measures that reduce the flooding.

Objective 2.5: Improve and maintain public access to city waterways including public beaches, parks and other natural areas

Activity: Continue with the development of a public fishing pier at City Park.

Activity: Continue City Policy of not approving closure of public streets that lead to water ways.

Objective 2.6: Protect, enhance, restore and manage wetlands, beaches, forests and other ecosystems including remaining waterfowl and wildlife habitats

Activity: Continue to aggressively enforce the regulations protecting the wetlands within the City's boundaries.

Activity: Continue to investigate opportunities that will allow the creation of addition parks such as Paradise Creek Park.

e. Repetitive Losses

Objective 2.7: Make certain all aspects of flooding are included in mitigation efforts.

Activity: Make certain any repetitive loss strategies include sea-level rise and possible lines of retreat to address flooding conditions.

3. Provide for optimal use and enjoyment of public and private property while maintaining the greatest level of flood protection possible.

Objective 3.1: Maintain physical and visual links between downtown and waterfront.

Objective 3.2: Evaluate and promote construction methods and best management practices to promote flood resiliency within the maritime community.

Objective 3.4: Develop, promote and manage a greenway and open space preservation program throughout the city, which provides protection to open space and environmentally sensitive areas.

Activity: Protect, enhance, restore and manage wetlands, beaches, forests and other ecosystems including remaining waterfowl and wildlife habitats.

Activity: Improve and maintain public access to city waterways including public beaches, parks and other natural areas with an emphasis on protecting natural shoreline or promoting living shoreline as a preferred erosion reduction method.

7. ADOPT THE PLAN

R-15-22

A RESOLUTION ADOPTING A REVISED FLOODPLAIN MANAGEMENT PLAN FOR THE CITY OF PORTSMOUTH, VIRGINIA.

WHEREAS, in order to remain a participating member of the National Flood Insurance Program's Community Rating System Program, a floodplain management plan must be adopted by the governing body of the participating member locality and updated every five years; and

WHEREAS, the City's Comprehensive Plan also identifies the need to "continue to participate in the National Flood Insurance Program, enforce the Floodplain Ordinance, and pursue policies to minimize the risks of flood damages"; and

WHEREAS, the City Council originally adopted a Floodplain Management Plan on September 13, 2005, and

WHEREAS, the City Council adopted an updated Floodplain Management Plan on October 12, 2010; and

WHEREAS, in compliance with the federal floodplain management plan revision requirements, the City Council received a presentation concerning the purpose of the Plan revision and the proposed schedule on August 23, 2014; and

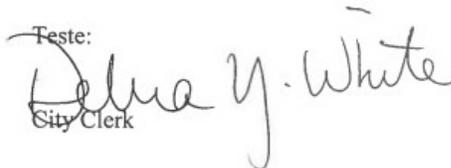
WHEREAS, the City Council appointed a Flood Task Force comprised of representatives from city staff, public agencies, citizens, and the media on September 23, 2014; and

WHEREAS, after a five month period of meetings and input from the Flood Task Force, a revised Floodplain Management Plan incorporating the input received has been prepared;

NOW THEREFORE BE IT RESOLVED by the Council of the City of Portsmouth, Virginia that it hereby approves and adopts the above-referenced revised Flood Management Plan.

BE IT FURTHER RESOLVED that the City Manager is authorized and directed to take such additional measures as may be required to continue the City's membership in the National Flood Insurance Program's Community Rating System Program.

ADOPTED by the Council of the City of Portsmouth, Virginia at a meeting held on September 8, 2015.

Teste:

City Clerk

APPENDICES

A. Portsmouth Census Statistics

People QuickFacts	Portsmouth city	Virginia
<i>i</i> Population, 2013 estimate	96,205	8,260,405
<i>i</i> Population, 2010 (April 1) estimates base	95,535	8,001,031
<i>i</i> Population, percent change, April 1, 2010 to July 1, 2013	0.7%	3.2%
<i>i</i> Population, 2010	95,535	8,001,024
<i>i</i> Persons under 5 years, percent, 2013	7.5%	6.2%
<i>i</i> Persons under 18 years, percent, 2013	23.5%	22.6%
<i>i</i> Persons 65 years and over, percent, 2013	13.6%	13.4%
<i>i</i> Female persons, percent, 2013	51.9%	50.8%
<i>i</i> White alone, percent, 2013 (a)	41.9%	70.8%
<i>i</i> Black or African American alone, percent, 2013 (a)	53.5%	19.7%
<i>i</i> American Indian and Alaska Native alone, percent, 2013 (a)	0.5%	0.5%
<i>i</i> Asian alone, percent, 2013 (a)	1.3%	6.1%
<i>i</i> Native Hawaiian and Other Pacific Islander alone, percent, 2013 (a)	0.1%	0.1%
<i>i</i> Two or More Races, percent, 2013	2.7%	2.7%
<i>i</i> Hispanic or Latino, percent, 2013 (b)	3.6%	8.6%
<i>i</i> White alone, not Hispanic or Latino, percent, 2013	39.7%	63.6%
<i>i</i> Living in same house 1 year & over, percent, 2009-2013	80.5%	84.7%
<i>i</i> Foreign born persons, percent, 2009-2013	2.7%	11.3%
<i>i</i> Language other than English spoken at home, pct age 5+, 2009-2013	4.6%	14.9%
<i>i</i> High school graduate or higher, percent of persons age 25+, 2009-2013	82.4%	87.5%
<i>i</i> Bachelor's degree or higher, percent of persons age 25+, 2009-2013	19.5%	35.2%
<i>i</i> Veterans, 2009-2013	10,778	726,470
<i>i</i> Mean travel time to work (minutes), workers age 16+, 2009-2013	24.4	27.7
<i>i</i> Housing units, 2013	40,848	3,412,460
<i>i</i> Homeownership rate, 2009-2013	57.2%	67.3%
<i>i</i> Housing units in multi-unit structures, percent, 2009-2013	30.3%	21.7%
<i>i</i> Median value of owner-occupied housing units, 2009-2013	\$175,600	\$244,600

Households, 2009-2013	36,690	3,022,739
Persons per household, 2009-2013	2.52	2.60
Per capita money income in past 12 months (2013 dollars), 2009-2013	\$23,138	\$33,493
Median household income, 2009-2013	\$46,166	\$63,907
Persons below poverty level, percent, 2009-2013	18.4%	11.3%
Business QuickFacts	Portsmouth city	Virginia
Private nonfarm establishments, 2012	1,697	192,730 ¹
Private nonfarm employment, 2012	27,800	3,089,241 ¹
Private nonfarm employment, percent change, 2011-2012	0.7%	2.0% ¹
Nonemployer establishments, 2012	4,557	529,636
Total number of firms, 2007	5,404	638,643
Black-owned firms, percent, 2007	31.4%	9.9%
American Indian- and Alaska Native-owned firms, percent, 2007	S	0.5%
Asian-owned firms, percent, 2007	4.8%	7.0%
Native Hawaiian and Other Pacific Islander-owned firms, percent, 2007	F	0.1%
Hispanic-owned firms, percent, 2007	2.8%	4.5%
Women-owned firms, percent, 2007	37.7%	30.1%
Manufacturers shipments, 2007 (\$1000)	652,915	92,417,797
Merchant wholesaler sales, 2007 (\$1000)	173,615	60,513,396
Retail sales, 2007 (\$1000)	682,095	105,663,299
Retail sales per capita, 2007	\$6,728	\$13,687
Accommodation and food services sales, 2007 (\$1000)	106,189	15,340,483
Building permits, 2012	139	27,278
Geography QuickFacts	Portsmouth city	Virginia
Land area in square miles, 2010	33.65	39,490.09
Persons per square mile, 2010	2,838.8	202.6
FIPS Code	740	51
Metropolitan or Micropolitan Statistical Area	Virginia Beach-Norfolk-Newport News, VA-NC Metro Area	

B. Floodplain Management Task Force and Plan Resolution

R-14-31

A RESOLUTION CREATING AND APPOINTING MEMBERS OF A TASK FORCE TO DEVELOP A FLOOD PLAIN MANAGEMENT PLAN AND TO SERVE AS A PUBLIC INFORMATION DEVELOPMENT GROUP.

WHEREAS, the City of Portsmouth desires to protect its citizens from damage and injury resulting from flooding; and

WHEREAS, the federal government has adopted numerous programs to reduce the effects of flood damage; and

WHEREAS the City of Portsmouth is a participating community in good standing in the National Flood Insurance Program and attempts to maximize the City's prating under the Program's Community Rating System ; and

WHEREAS the City is required to adopt a Flood Plain Management Plan ("Plan") and to update it every five years; and

WHEREAS, the City last updated its Plan in 2010; and

WHEREAS, in order to provide a high level of governmental transparency and to maximize the possibility of reduced flood insurance premiums for its citizens, the City has determined that a larger and more diverse task force is needed to develop the updated Plan.

NOW THEREFORE BE IT RESOLVED by the Council of the City of Portsmouth, Virginia that there is hereby created the Flood Plain Management Plan Task Force whose duty shall be to prepare an updated "Flood Plain Management Plan" in a manner as required by the Community Rating System Coordinators Manual and to serve as a public information development group.

BE IT FURTHER RESOLVED that the Task Force shall be composed of the following city staff members:

Director of Neighborhood Advancement
Neighborhood Advancement, Floodplain Manager
Director of Planning
Planning Staff
City Engineer
Director of Public Works
Building Official
GIS Department Manager
Fire Department EMS designee
Police Chief designee
Director of Marketing and Communications
Office of the City Manager, Senior Management Analyst

BE IT FURTHER RESOLVED that the Task Force shall include the following other

public agency staff members and representatives:

Portsmouth Health Department designee
Virginia Cooperative Extension Unit Coordinator
Portsmouth Public Schools, Science Teacher
Old Dominion University, Virginia Sea Grant participant
Portsmouth Redevelopment and Housing Authority representative
NAVFAC MIDLANT (Norfolk Naval Shipyard representative)
Naval Support Activity Hampton Roads (Naval Medical Center representative)
Craney Island representative
NAVFAC MIDLANT Regional representative
Coast Guard Liaison
School Operations representative
US Army Corps of Engineers, Flood Plain Management Services Section representative

BE IT FURTHER RESOLVED that the Task Force shall include the following citizen members:

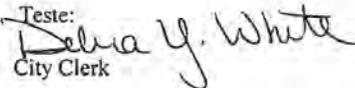
Historic Preservation Commission member
Olde Towne resident
Cradock resident
Port Norfolk
Churchland resident
Brighton/Prentis Park resident
Lee Ward / North Brighton resident
HBA/Towne Bank representative
Hampton Roads Realtors Association representative
Tidewater Builders Association representative
Port of Virginia representative

BE IT FURTHER RESOLVED that the Task Force shall include members of the following media organizations:

The Virginian-Pilot
WAVY TV

BE IT FURTHER RESOLVED that the Task Force shall present a proposed Flood Plain Management Plan to the City Council for adoption by September 1, 2015, and shall meet periodically thereafter until December 31, 2018 to consider new materials and methods to prevent flood damage and make necessary recommendations to City Council.

ADOPTED by the Council of the City of Portsmouth, Virginia at a meeting held on September 23, 2014.

Teste:

City Clerk

C. Annexation Map



D. The Hurricane History of Coastal Virginia

Continuous weather records for the Hampton Roads Area of Virginia began on January 1, 1871 when the National Weather Service was established in downtown Norfolk. The recorded history of significant tropical storms that affected the area goes back much further. Prior to 1871, very early storms have been located in ship logs, newspaper accounts, history books, a countless other writings. The residents of coastal Virginia during Colonial times were very much aware of the weather. They were a people that lived near the water and largely derived their livelihood from the sea. To them, a tropical storm was indeed a noteworthy event. The excellent records left by some of Virginia's early settlers and from official records of the National Weather Service are summarized below. Learning from the past will help us prepare for the future.

SEVENTEENTH AND EIGHTEENTH CENTURIES

1635	August	24	First historical reference to a major hurricane that could have affected the VA coast.
1667	September	6	It appears likely this hurricane caused the widening of the Lynnhaven River. The Bay rose 12 feet above normal and many people had to flee.
1693	October	29	From the Royal Society of London, There happened a most violent storm in VA which stopped the course of ancient channels and made some where there never were any.
1749	October	19	Tremendous hurricane. A sand spit of 800 acres was washed up and with the help of a hurricane in 1806 it became Willoughby Spit. The Bay rose 15 feet above normal.

Historical records list the following tropical storms as causing significant damage in Virginia: September 1761; October 176 September 1769; September 1775; October 1783; September 1785; July 1788.

NINETEENTH CENTURY

1806	August	23	Called the Great Coastal Hurricane of 1806.
1821	September	3	One of the most violent hurricanes on record.
1846	September	8	Hatteras and Oregon Inlets were formed.
1876	September	17	Average 5 minute wind speed at Cape Henry was 78 mph; 8.32" of rain
1878	October	23	Cobb and Smith Islands, on the Eastern Shore, were completely submerged. Average 5 minute wind at Cape Henry was 84 mph. Eighteen died when the A.S. Davis went ashore near Virginia Beach.
1879	August	18	Tide in Norfolk 7.77 feet above Mean Lower Low Water. Average 5 minute wind speed at Cape Henry 76 mph with 100 mph estimated gusts.
1887	October	31	Average 5 minute wind speed at Cape Henry 78 mph. The storm caused a record number of marine disasters.
1893	August	23	Average 5 minute wind speed at Cape Henry 88 mph.
1894	September	29	Five minute wind speed at Cape Henry 80 mph; gusts to 90 mph.
1897	October	25	Lasted 60 hours. Norfolk tides 8.1 feet above Mean Lower Low Water.
1899	October	31	Average 5 minute wind at Cape Henry 72 mph. Tide in Norfolk reached 8.9 feet above MLLW

Noteworthy storms also occurred in June 1825, August 1837, August 1850 and September 1856.

TWENTIETH CENTURY

1903	October	10	Average 5 minute wind speed at Cape Henry 74 mph, the tide in Norfolk reached 9 feet above MLLW.
1924	August	26	Average 1 minute wind speed 72 mph at Cape Henry.
1924	September	30	Fastest 1 minute wind speed in Norfolk 76 mph.

1926	August	22	Fastest 1 minute wind speed in Cape Henry 74 mph.
1928	September	19	Fastest 1 minute wind speed at Cape Henry 72 mph. The tide reached 7.16 feet above MLLW in Norfolk.
1933	August	23	This hurricane established record high tide of 9.8 feet above Mean Lower Low Water. 18 people died. Highest 1 minute wind speed in Norfolk was 70 mph, 82 mph at Cape Henry, and 88 mph at NAS, Norfolk.
1933	September	16	Fastest 1 minute wind speed was 88 mph at NAS, Norfolk, 75 mph at the NWS City Office, and 87 mph at Cape Henry. The tide reached 8.3 feet above MLLW..
1936	September	18	The fastest 1 minute wind speed was 84 mph at Cape Henry and 68 mph at the NWS City Office. The tide reached 9.3 feet above MLLW and is the second highest tide of record.
1944	September	14	Fastest 1 minute wind speed was 134 mph at Cape Henry which is the highest speed of record in this area. Gusts were estimated to 150 mph. The NWS City Office recorded 72 mph with gusts to 90 mph.
1953	August	14	BARBARA. The fastest 1 minute wind speed was 72 mph at Cape Henry, 63 mph with gusts to 76 mph at Norfolk Airport.
1954	October	15	HAZEL. Fastest 1 minute wind speed was 78 mph at Norfolk Airport with gusts to 100 mph which is the highest wind speed of record for the Norfolk Airport location. A reliable instrument in Hampton recorded 130 mph.
1959	September	30	GRACIE. Passed through western Virginia, 6.79 inches of rain at Norfolk Airport in 24 hours. Storm spawned a tornado eight miles west of Charlottesville, killing 11 people.
1960	September	12	DONNA. Fastest 1 minute wind speed was 73 mph at Norfolk Airport, 80 mph at Cape Henry and estimated 138 mph at Chesapeake Light Ship. Lowest pressure of 28.65 inches holds the area record for a tropical storm. 3 deaths.
1964	September	1	CLEO. A storm noted for its rain. 11.40 inches in 24 hours is the heaviest in the coastal area since records began in 1871.
1969	August	19	CAMILLE. Made landfall in Mississippi on August 17. The storm tracked northward and dumped a record 27 inches of rain in the Virginia mountains, primarily in Nelson County. Flash flooding took the lives of 153 people.
1971	August	27	DORIA. The fastest 1 minute wind speed 52 mph at Norfolk Airport and 71 mph at NAS, Norfolk.
1972	June	21	AGNES. Made landfall on the Gulf Coast of Florida. As the storm crossed Virginia, it dumped 13.6 inches of rain on the east slopes of the Blue Ridge Mountains. The James River crested at a record high in Richmond. Virginia sustained \$222 million in damage, and 17 people died, mostly from flash flooding.
1979	September	5	DAVID. Passed through central Virginia. Spawned 2 severe tornadoes - one in Newport News with over \$2 million in damage and one in Hampton with a half million dollars in damage.
1985	September	27	GLORIA. Passed 45 miles east of Cape Henry. Fastest 1 minute wind speed WNW 46 mph, peak gust 67 mph at the Airport, NE 94 mph gust to 104 mph at the South Island CBBT. Highest tide 5.3 feet above Mean Lower Low Water, storm rainfall 5.65 inches and total Virginia damage \$5.5 million.
1986	August	17	CHARLEY. The weak center passed over southeast Virginia Beach. Fastest 1 minute wind speed NNE 40 mph gust E 63 mph at Norfolk International Airport; NE 94 mph gust to 104 mph at

- South Island CBBT; and NE 54 mph gust to 82 mph at Cape Henry. Highest tide 5.5 feet above MLLW. Less than \$1 million in damage in Virginia.
- 1996 July 12-13 **BERTHA**. Passed over portions of Suffolk and Newport News. Fastest 1 minute wind speed SE 35 mph gust to 48 mph at Norfolk International Airport. Bertha spawned 4 tornadoes across east-central Virginia. The strongest, an F1 tornado moved over Northumberland county injuring 9 persons and causing damages of several million dollars. Other tornadoes moved over Smithfield, Gloucester and Hampton.
- 1996 September 5 **FRAN**. Passed well west of the area over Danville. Fastest 1 minute wind speed SE 41 mph gust to 47 mph at Norfolk International Airport. Rainfall amounted to only 0.20 of an inch in Norfolk.
- 1998 August 27 **BONNIE**. Tracked over the northern Outer Banks. Fastest 1 minute wind speed NE 46 mph with gust to 64 mph at Norfolk Airport. NE 90 mph with gust to 104 mph at CBBT. 4-7 inches of rain combined with near hurricane force winds knocked out power to 320,000 customers. Highest tide 6.0 FT above MLLW. Most significant storm since 1960.
- 1999 August 30 **DENNIS**. Produced one of the most prolonged period of tropical storm conditions in eastern Virginia. Fastest 1 minute wind speed NE 43 mph with gust to 53 mph at Norfolk Int'l Airport. Storm total rainfall 3.30 inches. Significant beach erosion reported.
- 1999 September 6 **FLOYD**. Passed directly over Virginia Beach on a track similar to Hurricane Donna in 1960. Lowest pressure of 28.85" (977 MB) at Norfolk Int'l Airport 4th lowest for a hurricane this century. Fastest 1 minute wind NE 31mph with gust to 46 mph. Rainfall 6.80" with amounts of 12-18" in interior portions eastern Virginia. Franklin, VA reported 500 year flood of record. Largest peacetime evacuation in U.S. History.

TWENTY FIRST CENTURY

- 2003 September 18 **ISABEL**. Made landfall near Ocracoke NC. The center passed west of Emporia and west of Richmond. Fastest 1 minute wind speed NE 54 mph with gusts to 75 mph at Norfolk NAS; NE 61 mph with gusts to 74 mph at the South Island CBBT. Highest tide at Sewells Point was 7.9 feet above MLLW, which was a 5 ft surge. Significant beach erosion was reported. Numerous trees and power lines down over a wide area, with over 2 million households without power in VA. VA damage was over \$625 million, and there were over 20 deaths in VA.
- 2004 August 3 **ALEX** made its closest approach to land on August 3, 2004 with its center located about 9 nm southeast of Cape Hatteras/Outer Banks, NC as a Category 1. Alex produced locally heavy rainfall across portions of southeast Virginia, but little in the way of damage or flooding.
- 2004 August 14 **CHARLEY** made a second landfall near Cape Romain, SC as a weakening Category 1, after devastating portions of central and southwest Florida. Charley brought locally heavy rainfall and strong winds to much of southeast Virginia, especially near the coast. A wind gust to 72 mph was recorded at the Chesapeake Light buoy. In the U.S., 10 deaths and \$14 billion in damage resulted from Charley.

- 2004 August 30 **GASTON.** made landfall near Awendaw, SC, on August 29, 2004 as a Category 1. Gaston weakened as it lifted northward through North Carolina, then northeastward across southeast Virginia on August 30th. Gaston produced a swath of 5 to 14 inch rains extending from Lunenburg and Mecklenburg counties northeast into Caroline and Essex counties. The heaviest rainfall, centered on the Richmond metro area, produced a major flash flood which killed 8 people. Five of these deaths resulted from people driving into flooded roadways. A total of 13 tornadoes were observed in central and eastern Virginia, all producing FO damage. Total damage is estimated at \$130 million.
- 2004 September 8 **FRANCES.** made landfall over east central Florida as a Category 2. It then moved northeast into the northern Gulf of Mexico, eventually turning north, making a second landfall in the panhandle of Florida, and then weakening into a tropical depression. It tracked through western Virginia, then northeast and offshore the mid Atlantic coast. A total of 6 tornadoes were observed in central and eastern Virginia, the strongest producing F1 damage.
- 2004 September 17 **IVAN.** made landfall near the Florida/Alabama border as a category 3. It weakened to a tropical depression, and moved northeast, tracking along the Appalachian Mountains through western Virginia, then northeast and offshore the mid Atlantic coast. A total of 40 tornadoes were produced in Virginia, most in central and northern Virginia. This was a record single day outbreak for Virginia, and exceeded the previous ANNUAL tornado record (31). Most of these tornadoes were FO or F1 in intensity, although 10 F2 tornadoes and 1 F3 tornado touched down in south central...west central and northern Virginia.
- 2005 July 7-8 **CINDY.** The remnants of Hurricane Cindy moved northeastward through south central and eastern Virginia on July 7th and the early morning hours of July 8th. Cindy's remnants produced 7 F1 tornadoes, which downed trees and damaged buildings from portions of south central Virginia into Virginia's Northern Neck. No injuries or deaths were associated with the tornadoes. Rainfall amounts in the 3 to 5 inch range were common across northern, central and southwest Virginia...with only minor flooding reported.
- 2006 September 1 **ERNESTO.** The remnants of Tropical Storm Ernesto interacted with an unusually strong high pressure area over New England to generate strong winds, heavy rainfall, and storm surge related tidal flooding and damage. Five to eight inch rainfall amounts were common across central and eastern Virginia. This rainfall caused flooding in many areas, although no substantial river flooding resulted from the heavy rain. Wind gusts of 60 to 70 mph occurred on the Eastern Shore of Virginia, as well as areas adjacent to the Chesapeake Bay from Yorktown northward. Tides were particularly high from communities adjacent to the York River, northward through the Rappahannock River to tidal portions of the Potomac River. Tides of 4 to 5 feet above normal, combined with 6 to 8 foot waves, caused significant damage to homes, piers, bulkheads, boats, and marinas across portions of the Virginia Peninsula and Middle Peninsula near the Chesapeake Bay and adjacent tributaries. Similar damage also occurred in Chincoteague and Wachapreague on the Virginia Eastern Shore. At some locations on the Middle Peninsula, Northern Neck and Eastern Shore, the tidal flooding and damage rivaled that from Hurricane Isabel in 2003. Power outages were widespread across Virginia's Northern Neck and Middle Peninsula.

- 2008 September 6** **Hanna.** Tropical Storm Hanna moved through the mid Atlantic region on September 6, 2008. The primary impact was wind, with gusts between 45 and 55 mph common from northeast North Carolina northeastward through the Lower Maryland Eastern Shore. On the Chesapeake Bay and adjacent Atlantic coastal waters, wind gusts around 60 mph were recorded. Hanna's winds downed trees in scattered areas from eastern North Carolina, and central and eastern Virginia, into the DELMARVA, but no substantial structural damage or coastal flooding occurred. Hanna brought beneficial rainfall to much of the region, with 1 to 5 inches falling. Antecedent dry conditions prevented any inland flooding as a result of the rainfall.
- 2011 August 27** **Irene.** Hurricane Irene affected the Mid Atlantic Region brought strong winds, storm surge Flooding, and up to 12 inches of rain across eastern North Carolina, central and eastern Virginia, and the DELMARVA. Although Irene passed east of the Mid Atlantic Coast, the most substantial wind damage occurred in a swath from Caroline and Westmoreland counties southward into the Richmond metro area, then southeastward into Surry, Sussex, James City, and Southampton counties. Winds estimated between 70 and 80 mph downed many trees, blocked roads and caused widespread power outages. Storm surge flooding was most significant in Hampton Roads and, along the Albemarle and Currituck Sounds in northeast North Carolina. The heaviest rainfall occurred in a swath similar to Floyd (1999). However, the pre-storm conditions were much drier, which mitigated the amount of flooding. However, roads were closed, and some road washouts were reported in interior portions of the Northern Neck (primarily Essex and Caroline counties).
- 2012 October 28-30** **Sandy.** Hurricane Sandy was a late season hurricane that passed off the Mid Atlantic coast, before turning west, and striking the New Jersey coast on October 29th. Sandy was a very large storm that was transitioning from a tropical to a non-tropical storm as it moved north paralleling the U.S. East coast during the October 27-29 time frame. Sandy's impact was relatively small in Virginia, with very heavy rainfall and some flooding the biggest impacts. The most significant impact was felt on the DELMARVA, especially on the east side of the Chesapeake Bay from Salisbury, MD southward to Onancock, VA, where severe coastal flooding and storm surge inundated many areas, as Sandy passed by to the north. Crisfield, MD and Saxis, VA were hardest hit, with millions of dollars in damage to homes and businesses. Damage and flooding were worse than that which occurred in the same area during Hurricane Floyd (1999).

Hurricanes come close enough to produce hurricane force winds approximately three times every 20 years. Two or three times a century winds and tides produce considerable damage and significantly threaten life. Three known storms have been powerful enough to alter coastal features.

MLLW = Mean Lower Low water which is the mean of the lowest of the low tide values

Source - National Weather Service, Wakefield Office <http://weather.gov/akq>

E. Importance of Limit of Moderate Wave Action (LiMWA)



The coastal population in the United States has increased significantly over the last few decades. With this growth in population increased coastal development has occurred, putting more buildings at risk from flooding and other coastal action. Low-lying coastal areas are especially vulnerable to damage from erosion, waves, and storm surge. The National Flood Insurance Program (NFIP) depicts two coastal flood hazard zones on its Flood Insurance Rate Maps (FIRMs):

- Zone VE, where the flood elevation includes wave heights equal to or greater than 3 feet; and
- Zone AE, where the flood elevation includes wave heights less than 3 feet.

Post-storm field visits and laboratory tests throughout coastal United States have consistently confirmed that wave heights as low as 1.5 feet can cause significant damage to structures that are constructed without considering coastal hazards. FIRMs recently published also include a line showing the Limit of Moderate Wave Action, or LiMWA, which is the inland limit of the area expected to receive 1.5-foot or greater breaking waves during the 1-percent-annual-chance flood event (see Figure 1).

Understanding LiMWA

The addition of the LiMWA area to FIRMs allows communities and individuals to better understand the flood risks to their property. The LiMWA area alerts property owners on the coastal side of the line that although their property is in Zone AE, their property may be affected by 1.5-foot or higher breaking waves and may therefore be at significant risk during a 1-percent-annual-chance flood event. While not formally defined in the NFIP regulations or mapped as a flood zone, the area between Zone VE and the LiMWA is called the Coastal A Zone. This area is subject to flood hazards associated with floating debris and high-velocity flow that can erode and scour building foundations and, in extreme cases, cause foundation failure.

LiMWA Quick Facts...

- Waves of 1.5 feet or higher have been shown to cause significant damage to structures
- A LiMWA line is shown on FIRMs for areas along coastlines
- Structural fill should be prohibited in the Coastal A Zone
- I-Codes requires Zone VE construction standards in identified Coastal A Zone areas
- Structures in the Coastal A Zone should be built on pier or column foundations
- Enclosure size under all structures should be limited to 299 square feet or less within the Coastal A Zone
- Elevation of the lowest horizontal structural member of the lowest floor should be at or above the base flood elevation (BFE) (see <http://www.fema.gov/media-library/assets/documents/3490?id=1718> for more information)
- NFIP free-of-obstruction requirements apply in the Coastal A Zone
- Communities that adopt Zone VE standards in the Coastal A Zone and reference the LiMWA area receive Community Rating System (CRS) credits, which could lower flood insurance premiums for residents and business owners

For additional background information on LiMWA, please refer to FEMA Procedure Memorandum 50, available at: www.fema.gov/media-library/assets/documents/34953

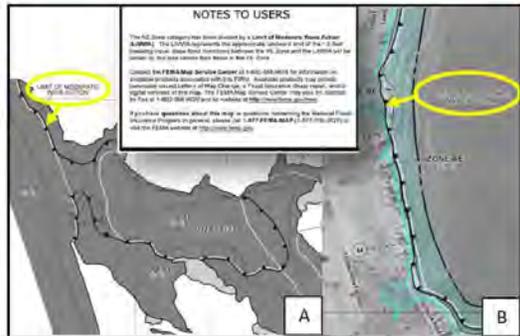


Figure 1: FIRM showing area within the LiMWA

"FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards."

Effects on Property Owners

Residents and business owners living or working in the Coastal A Zone should be aware of the potential wave action and the accompanying damage that could occur and cause significant damage to their property. Property owners are encouraged to build safer and higher to minimize the risk to life and property.

While the risk of damage is higher on the coastal side of the LiMWA than in other parts of Zone AE, NFIP premiums currently do not account for a building's location relative to the LiMWA. The Federal mandatory purchase requirement to carry flood insurance as a condition of obtaining a mortgage applies in Zone AE. Property owners are encouraged to carry coverage equivalent to the replacement cost of their building and include contents coverage.

FOR MORE INFORMATION...

FEMA's Floodplain Management Branch

Defines floodplain management and its role in the NFIP:
<http://www.fema.gov/floodplain-management>

Homebuilder's Guide to Coastal Construction

A series of fact sheets providing information about responsible building practices, including freeboard:
<http://www.fema.gov/library/viewRecord.do?id=2138>

FloodSmart

Information for consumers about flood insurance and the NFIP:
www.FloodSmart.gov



After an Event

After a significant event, FEMA may issue revised flood map. If remapping results in a higher-risk flood zone or a higher BFE (see Figure 2), the property owner should contact his or her insurance agent to discuss possible cost-saving options (e.g., elevating). To learn more about flood insurance and the risks of flooding, and to locate an agent, visit www.FloodSmart.gov.

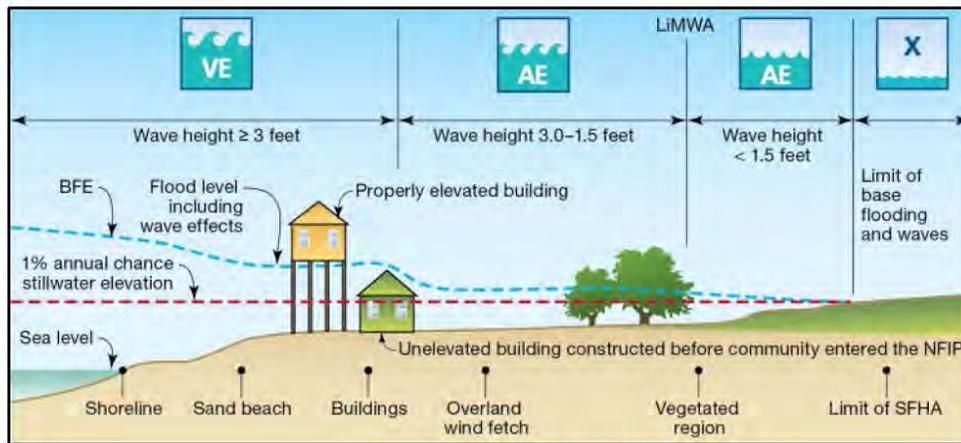


Figure 2: Graphic depiction of LiMWA

"FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards."

F. Links

City of Portsmouth Flood Information Website including interactive Flood Insurance Rate Maps for Portsmouth, Floodplain Development Regulations, Flood Insurance Information, and Emergency Preparedness Information

www.portsmouthva.gov/dna/flood-program.aspx

Portsmouth Emergency Operations Center website

www.portsmouthva.gov/eoc

Federal Emergency Management Agency website

www.fema.gov

Flood Insurance Information

The National Flood Insurance Program

www.fema.gov/national-flood-insurance-program

Coastal A Zones and Limit of Moderate Wave Action (LiMWA) animation

<https://www.fema.gov/media-library/assets/videos/82399>

National Flood Insurance Program (FloodSmart)

www.floodsmart.gov/floodsmart

Flood Damages

Repetitive Flood Claims

<https://www.fema.gov/repetitive-flood-claims-program>

Severe Repetitive Loss Program

<https://www.fema.gov/severe-repetitive-loss-program>

Grant Programs

Hazard Mitigation Grants

HMGP assists in implementing long-term hazard mitigation measures following a major disaster. <https://www.fema.gov/hazard-mitigation-grant-program>

PDM provides funds for hazard mitigation planning and projects on an annual basis. <https://www.fema.gov/pre-disaster-mitigation-grant-program>

FMA provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis.
<https://www.fema.gov/flood-mitigation-assistance-program>

Community Rating System site

www.fema.gov/national-flood-insurance-program-community-rating-system

Red Cross site

www.redcross.org

National Hurricane Center site

www.nhc.noaa.gov

Current weather site

www.weather.com

Prevent Flood Damages site

www.fema.gov/national-flood-insurance-program-2/nfip-technical-bulletins

Individual preparedness site

www.ready.gov/be-informed

Business Preparedness Guides

<http://www.ready.gov/business/implementation/continuity>

Preparedness site for pet owners

www.portsmouthva.gov/eoc/Preparingyourpets.asp

Preparedness site for persons with special needs

www.portsmouthva.gov/eoc/specialneeds.asp

Virginia Department of Conservation and Recreation Floodplain Management Program

www.dcr.virginia.gov/dam_safety_and_floodplains/index.shtml

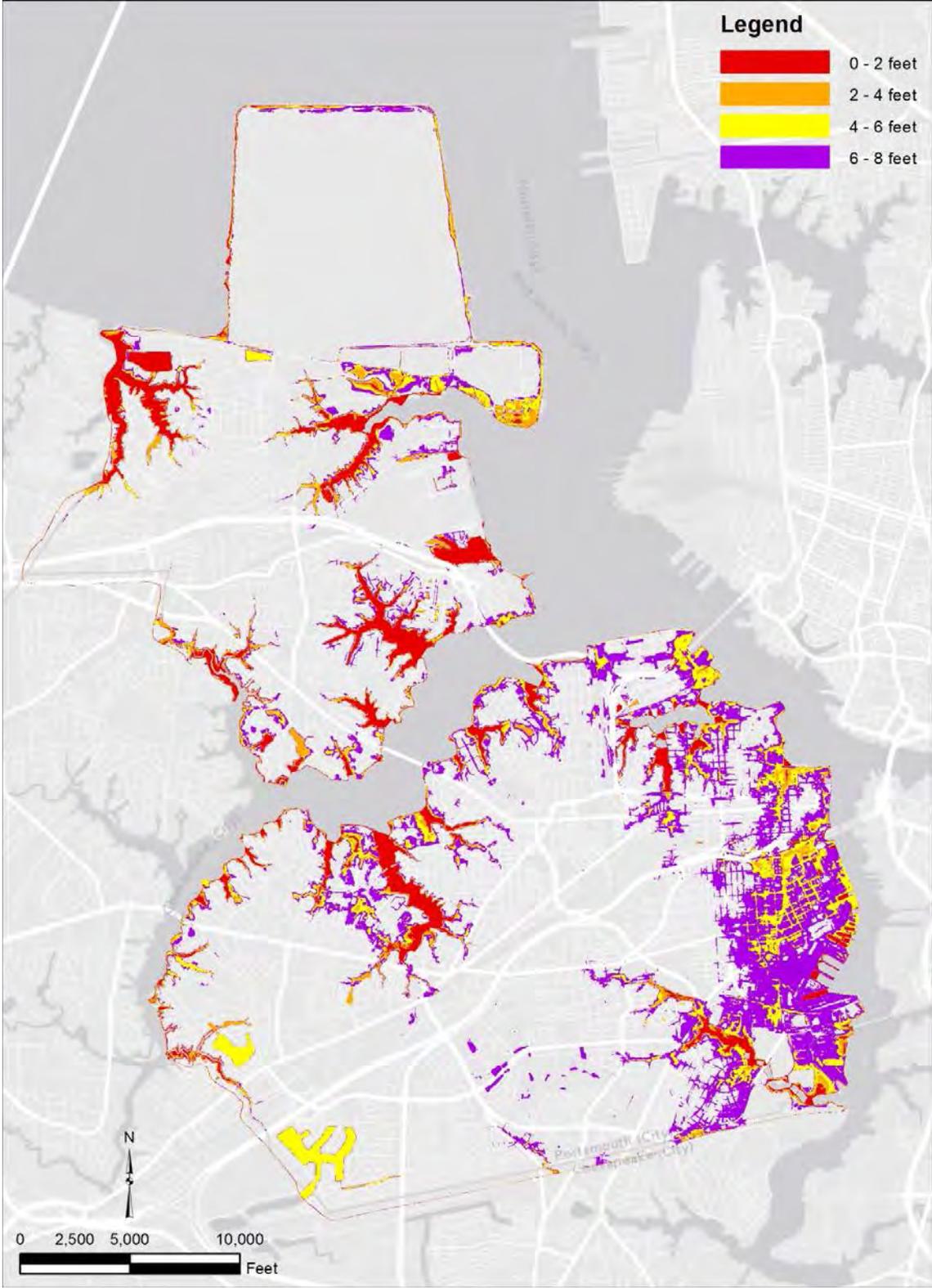
Virginia Department of Emergency Management

www.vaemergency.gov

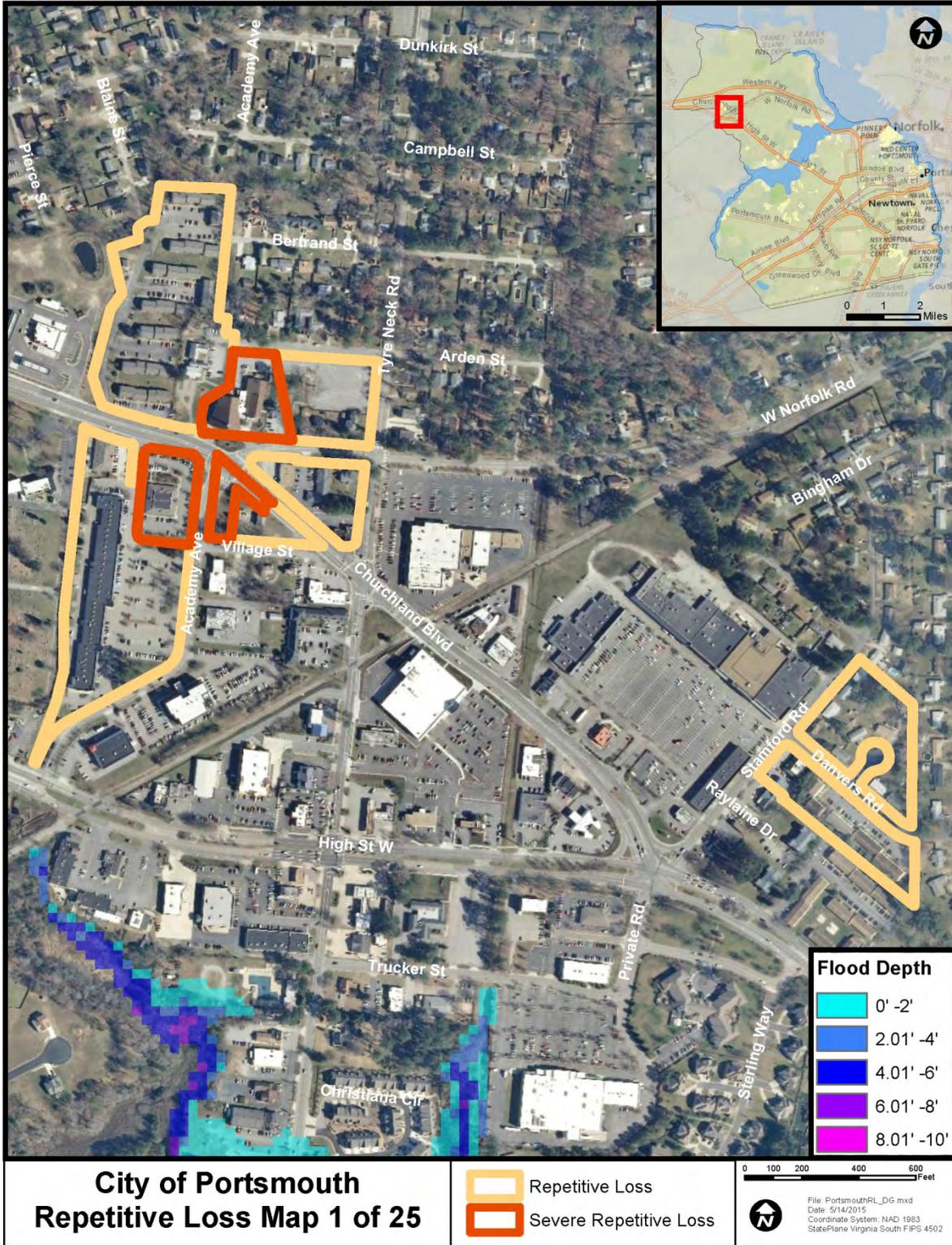
Road conditions

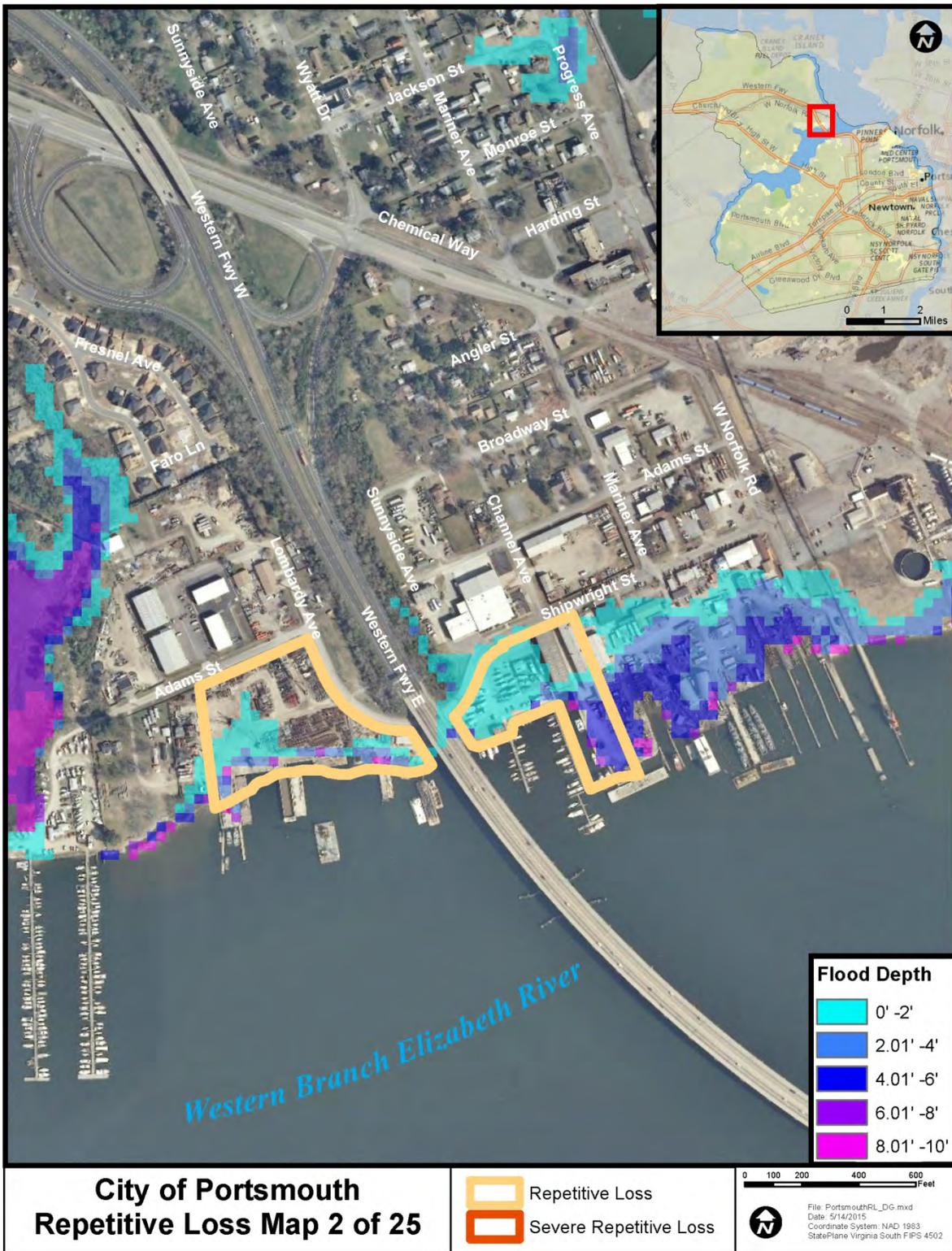
www.511virginia.org or **dial 511** from any phone for real-time traffic information and road condition reports.

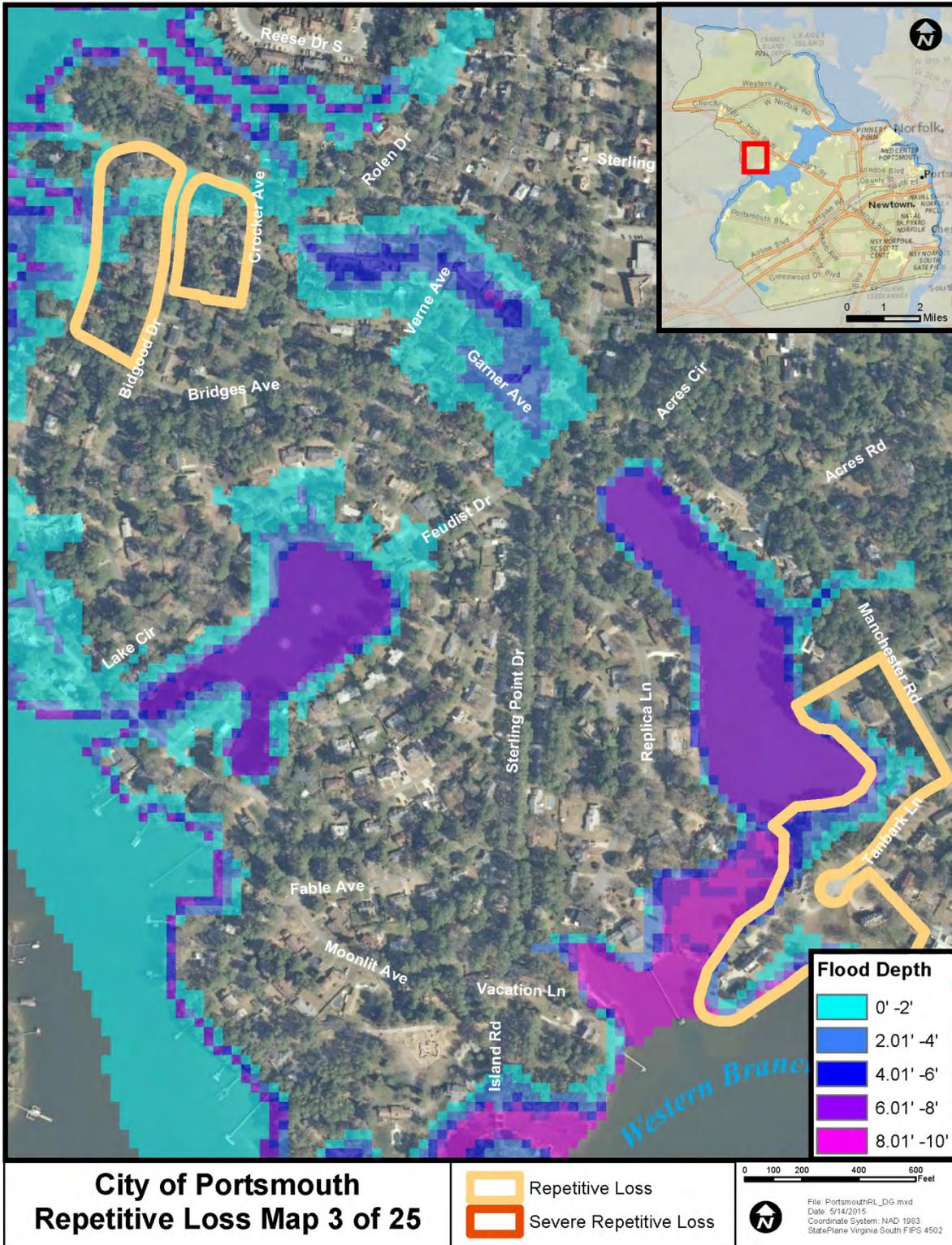
G. Sea Level Rise

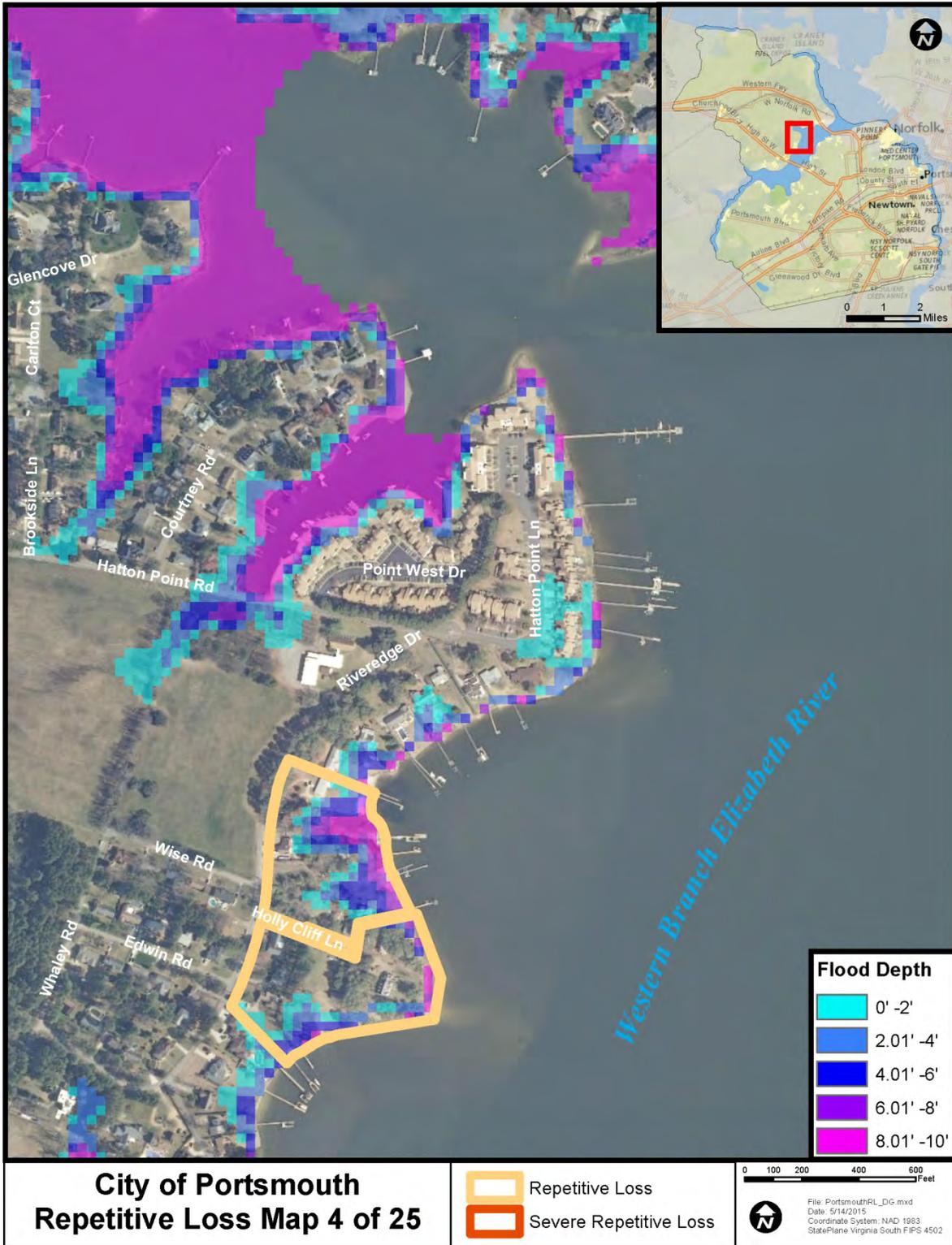


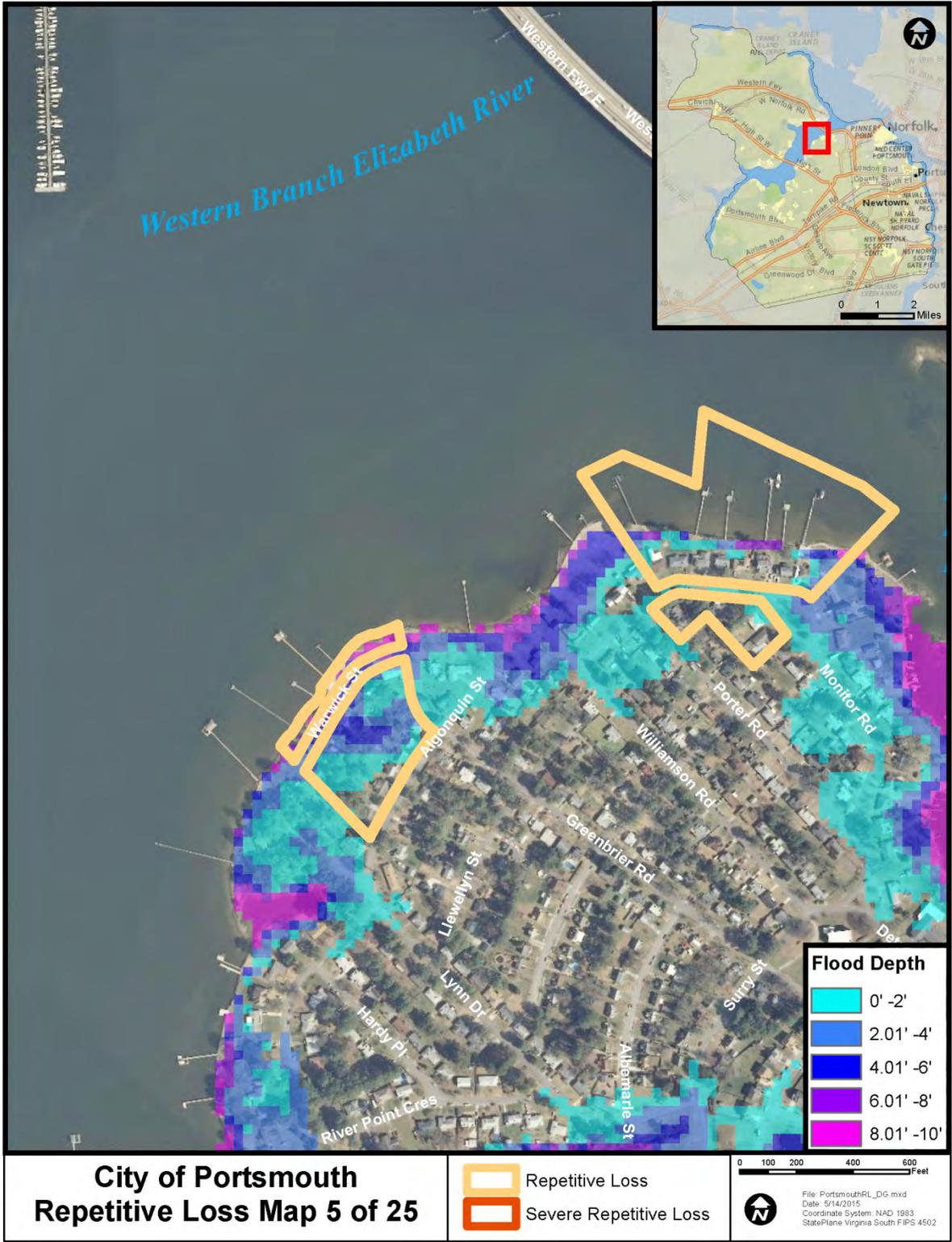
H. Repetitive and Severe Repetitive Loss

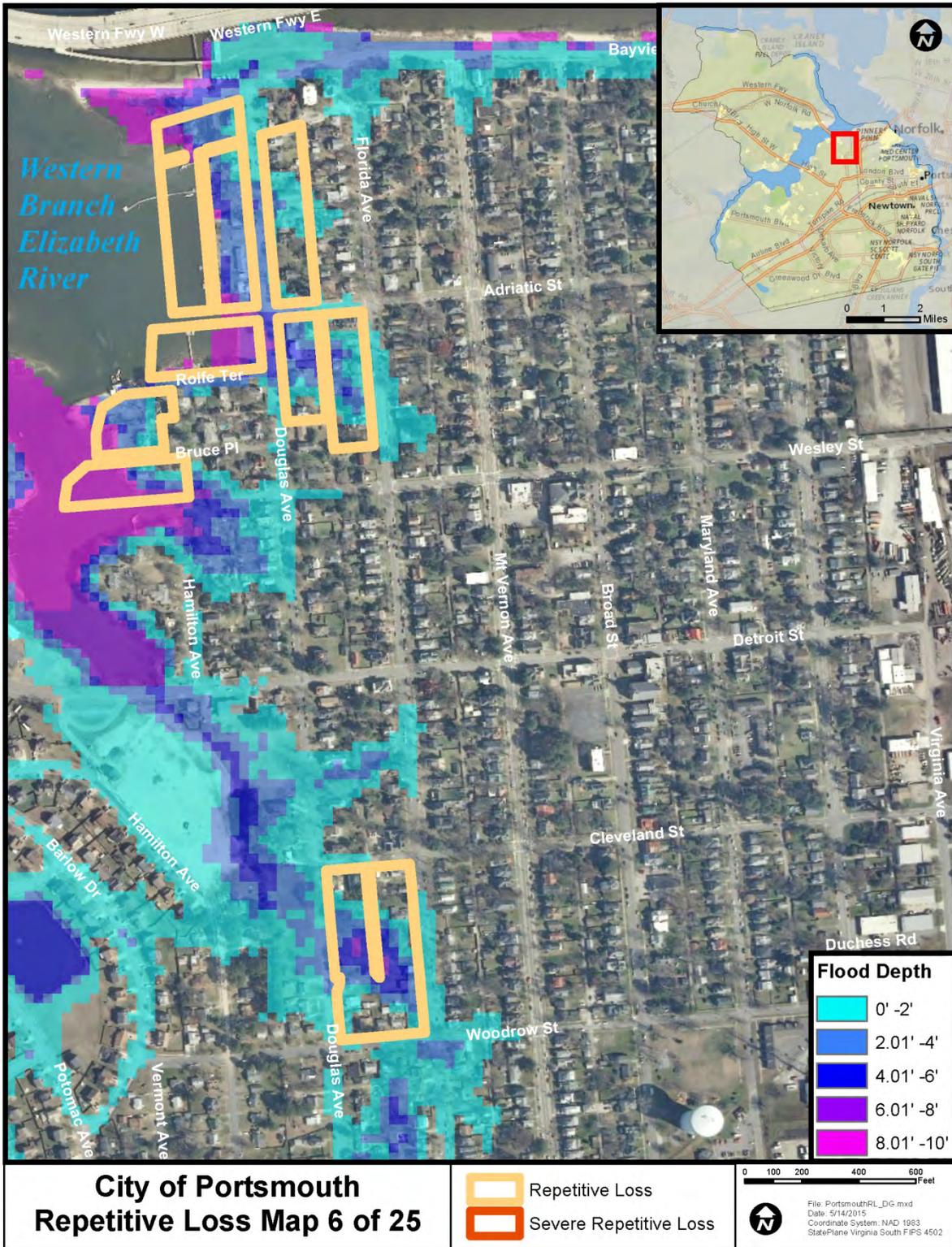












**City of Portsmouth
Repetitive Loss Map 6 of 25**

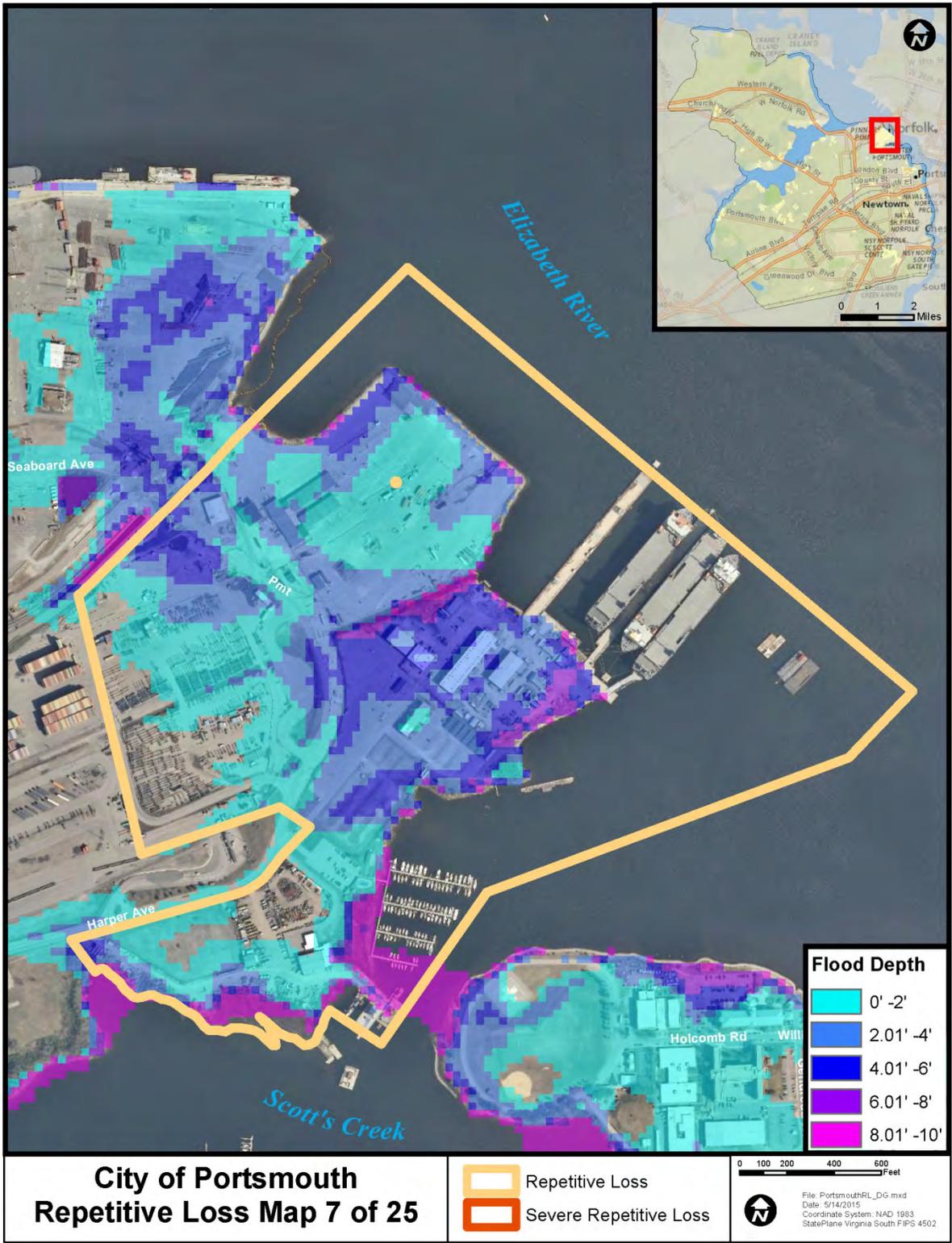
- Repetitive Loss
- Severe Repetitive Loss

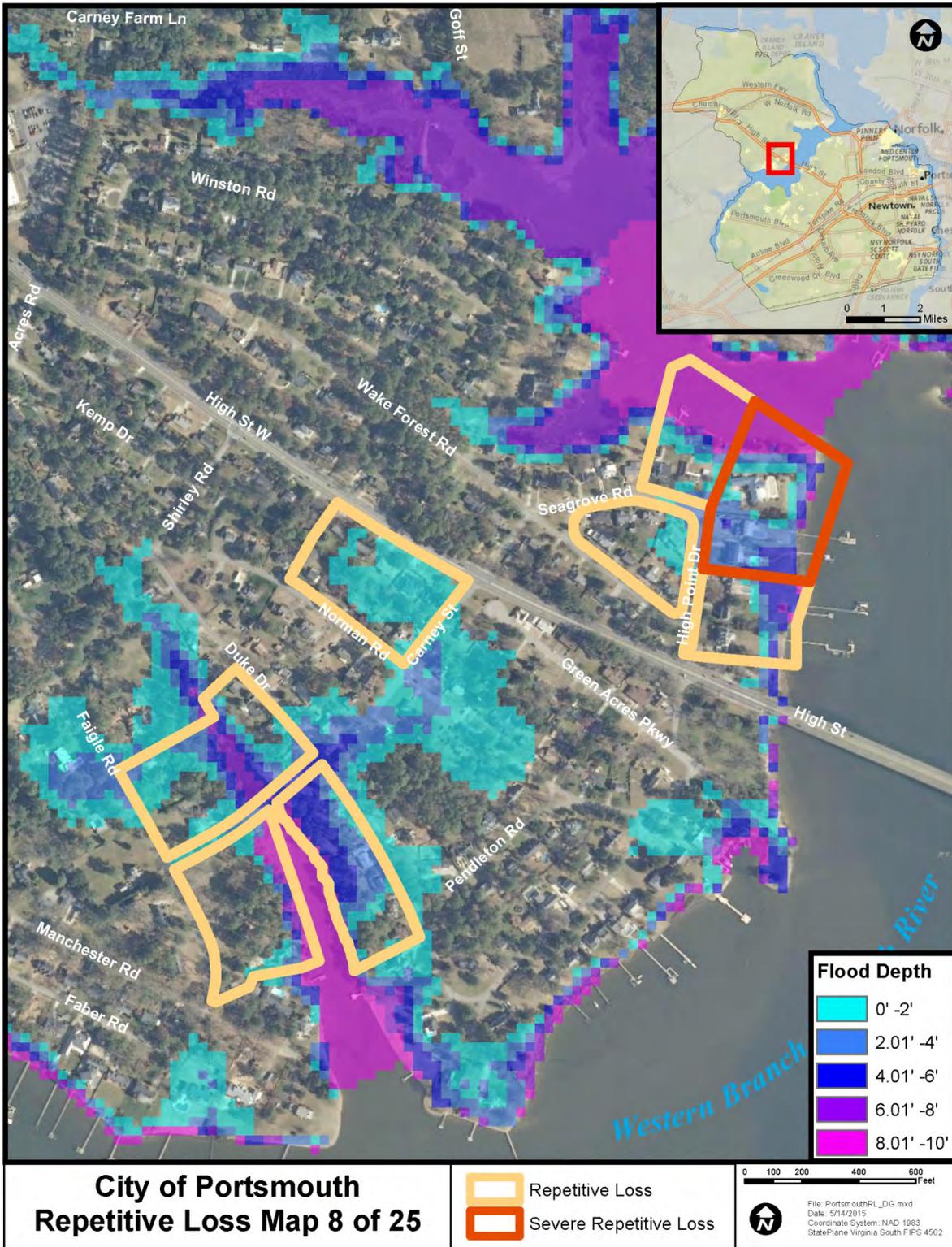
Flood Depth

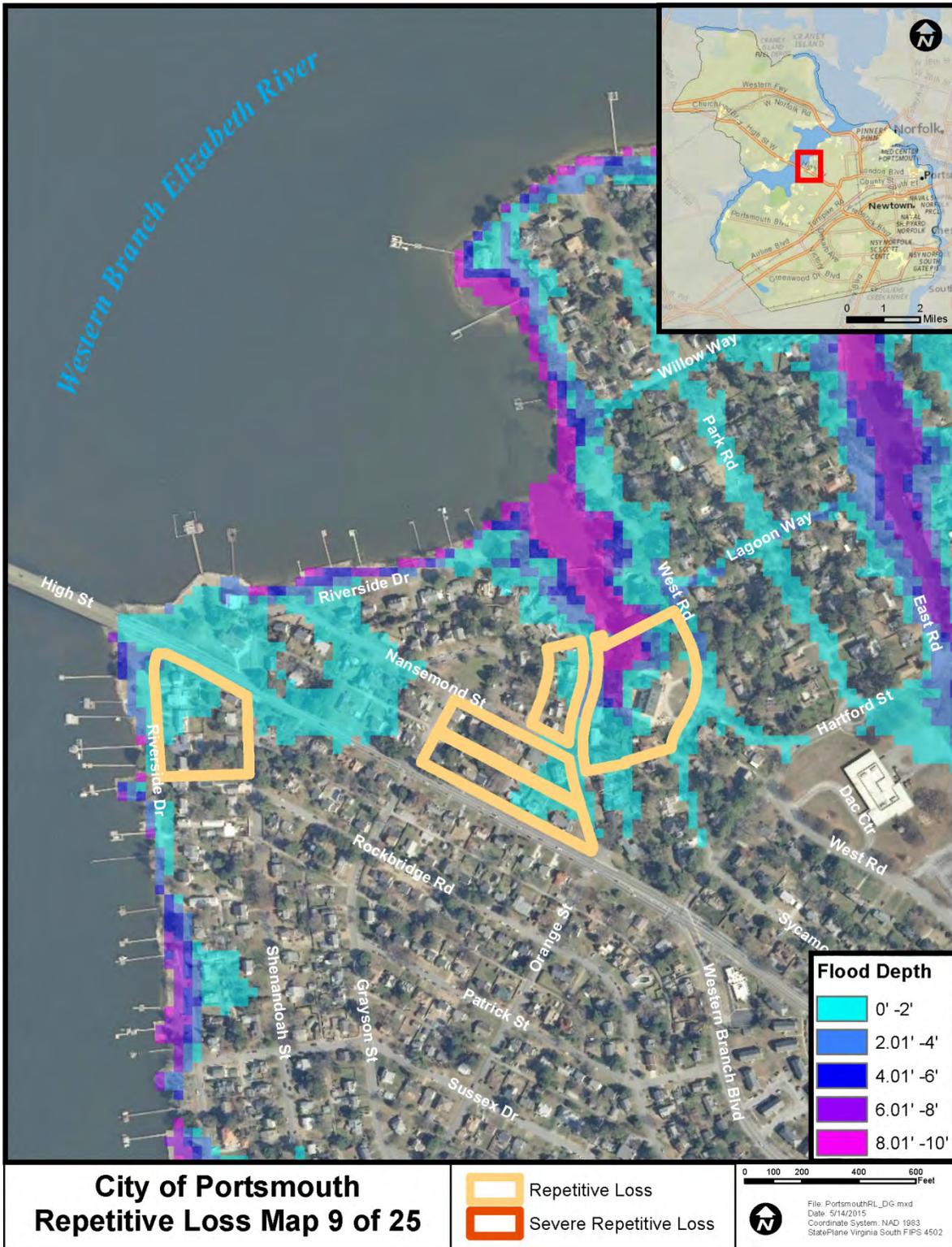
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	2.01' -4'
	4.01' -6'
	6.01' -8'
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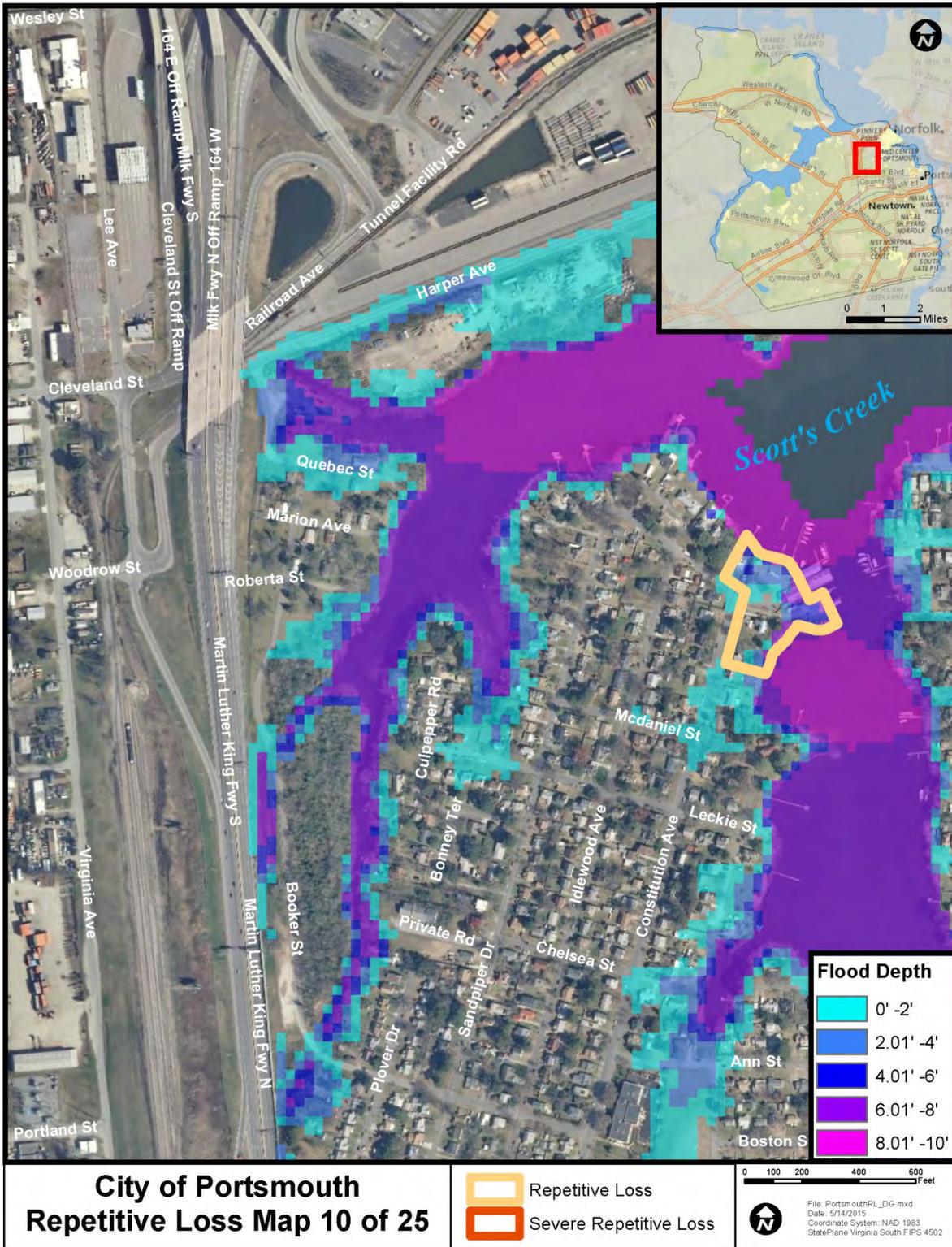
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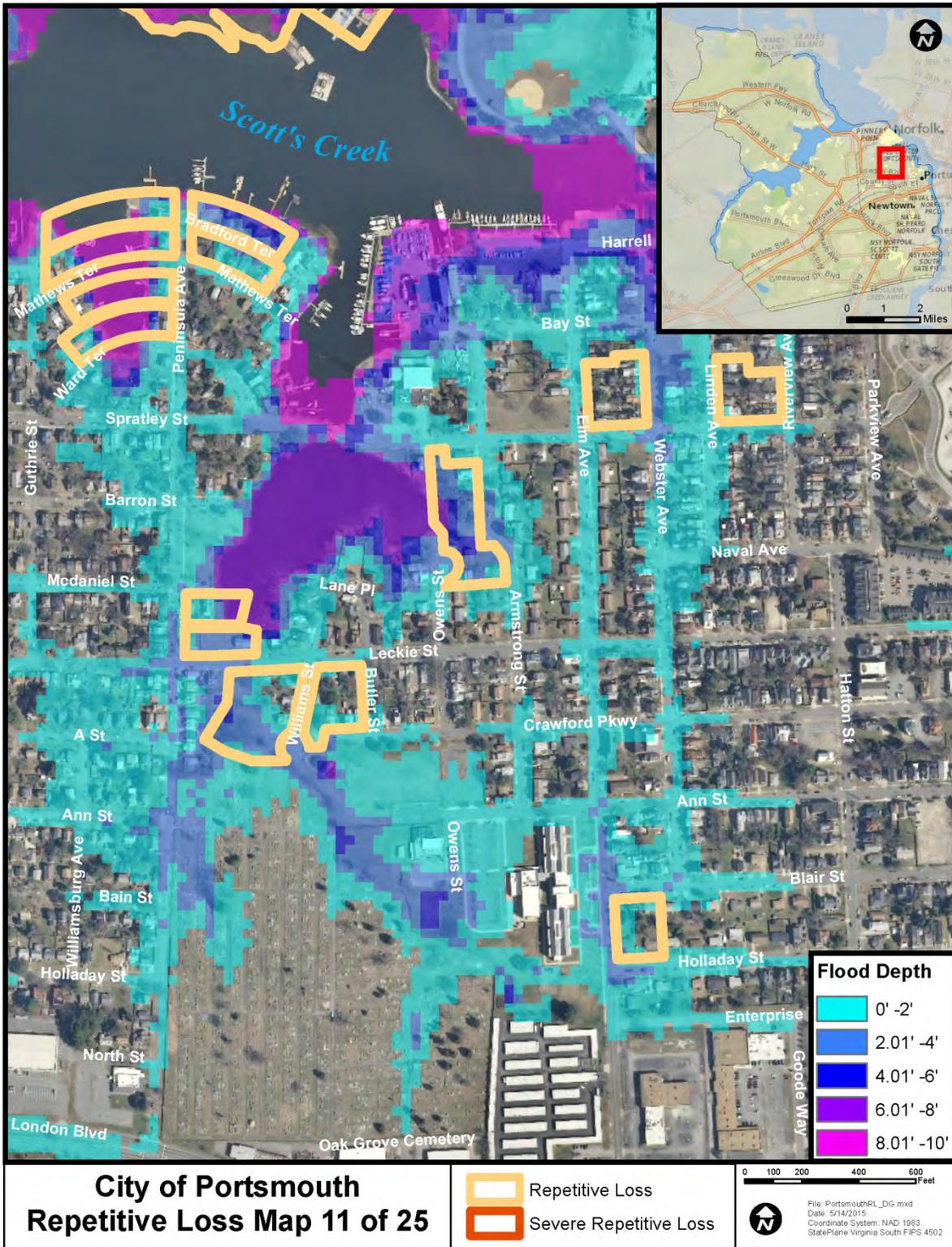
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Date: 5/14/2015
Coordinate System: NAD 1983
StatePlane Virginia South FIPS 4502











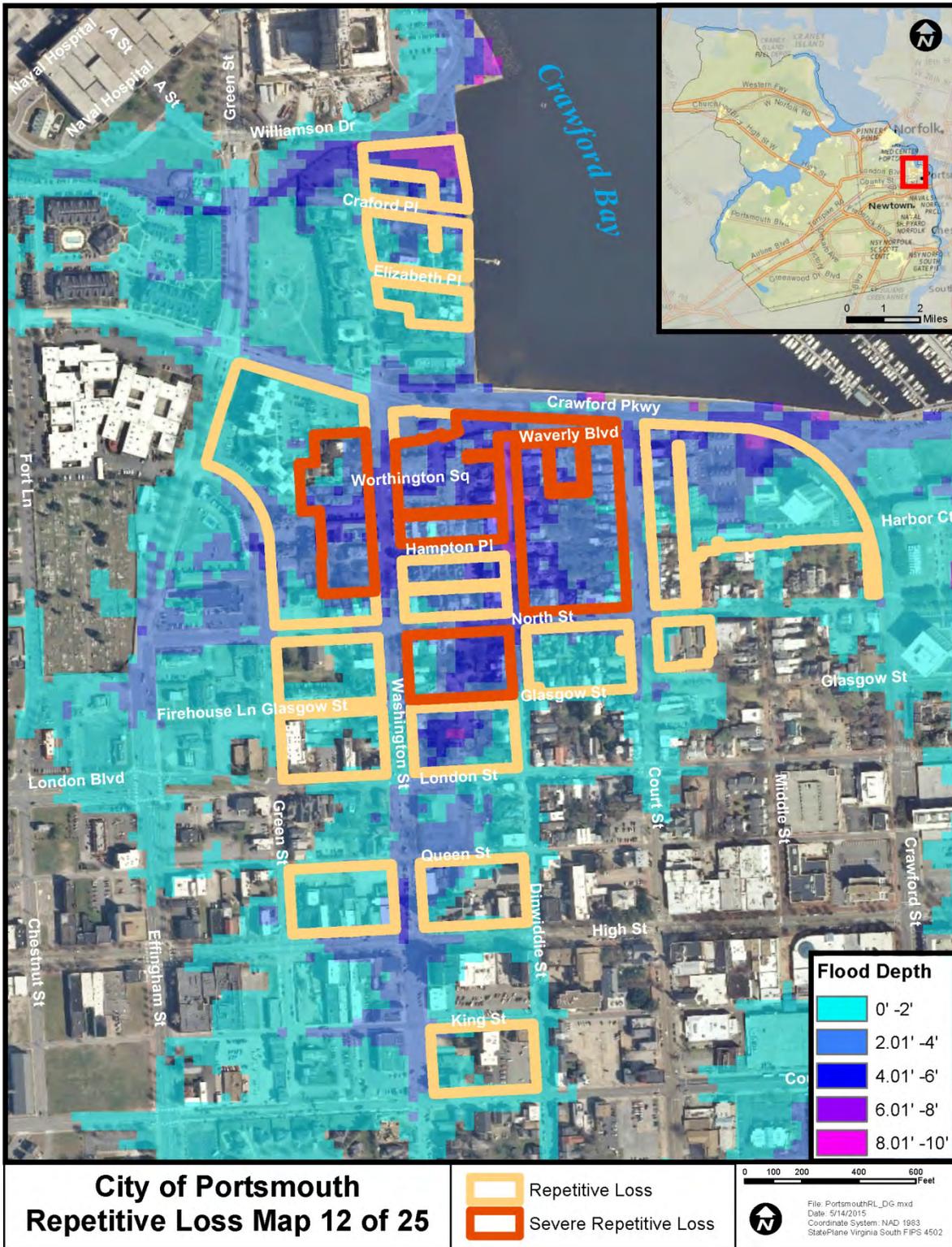
**City of Portsmouth
Repetitive Loss Map 11 of 25**

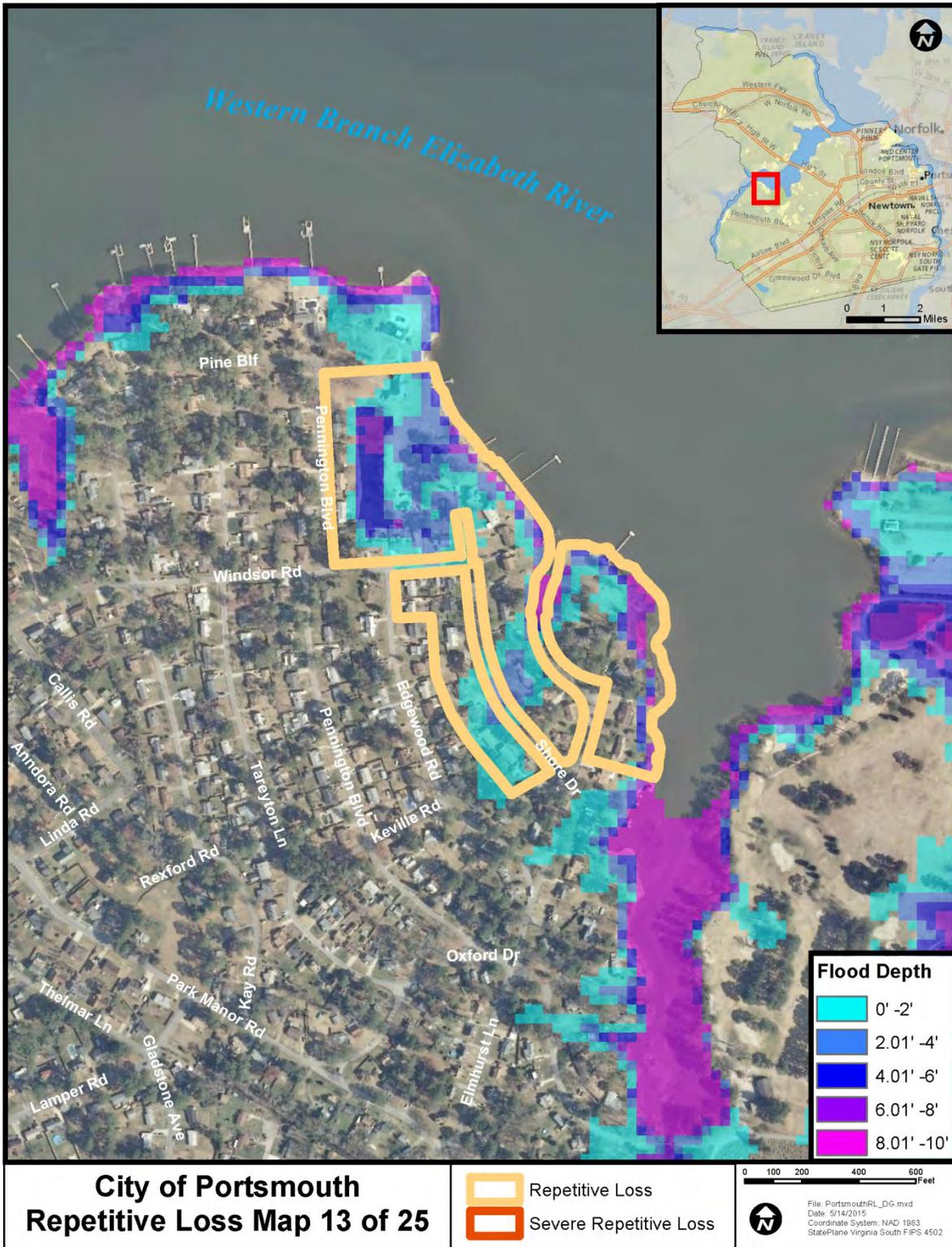
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-  Severe Repetitive Loss

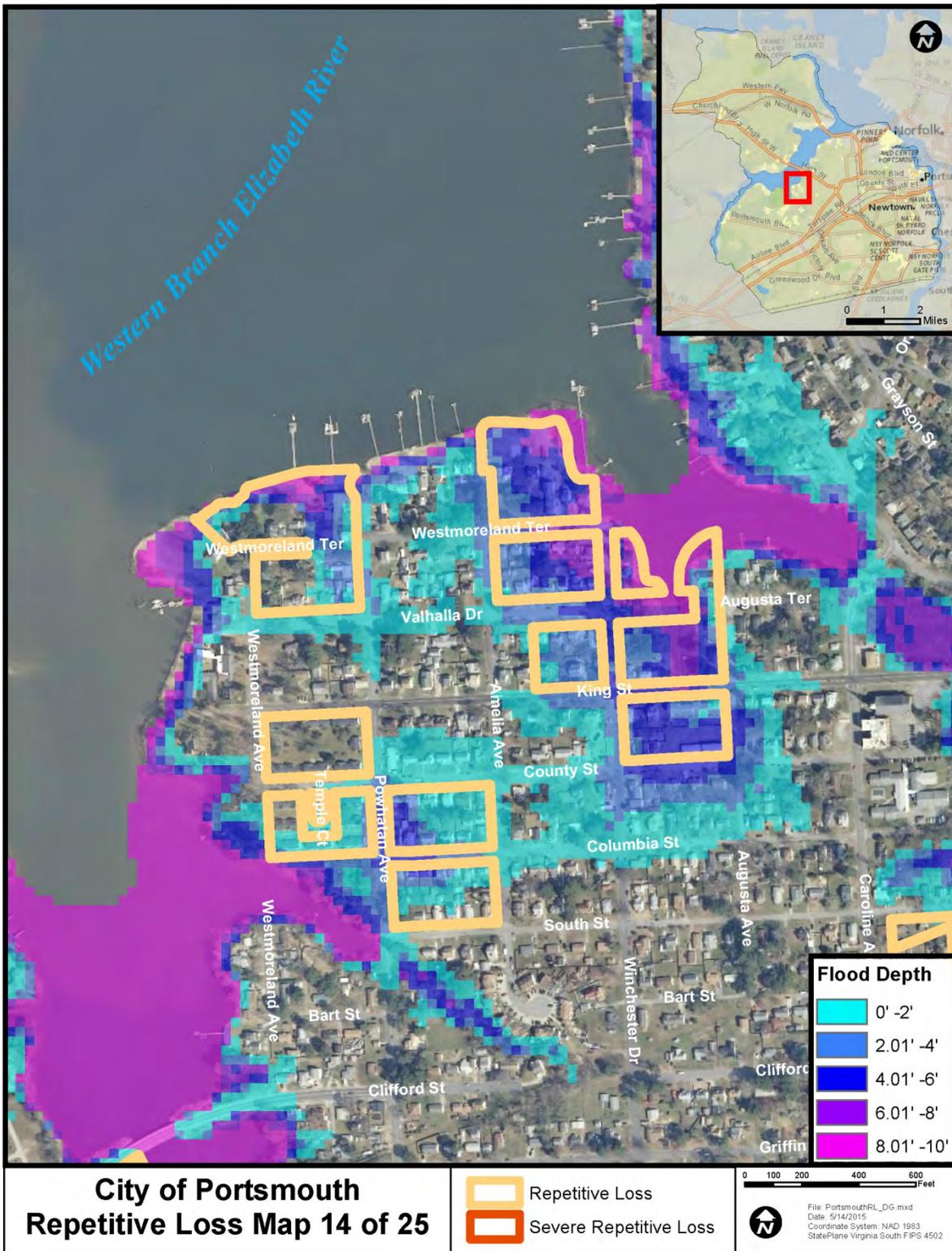
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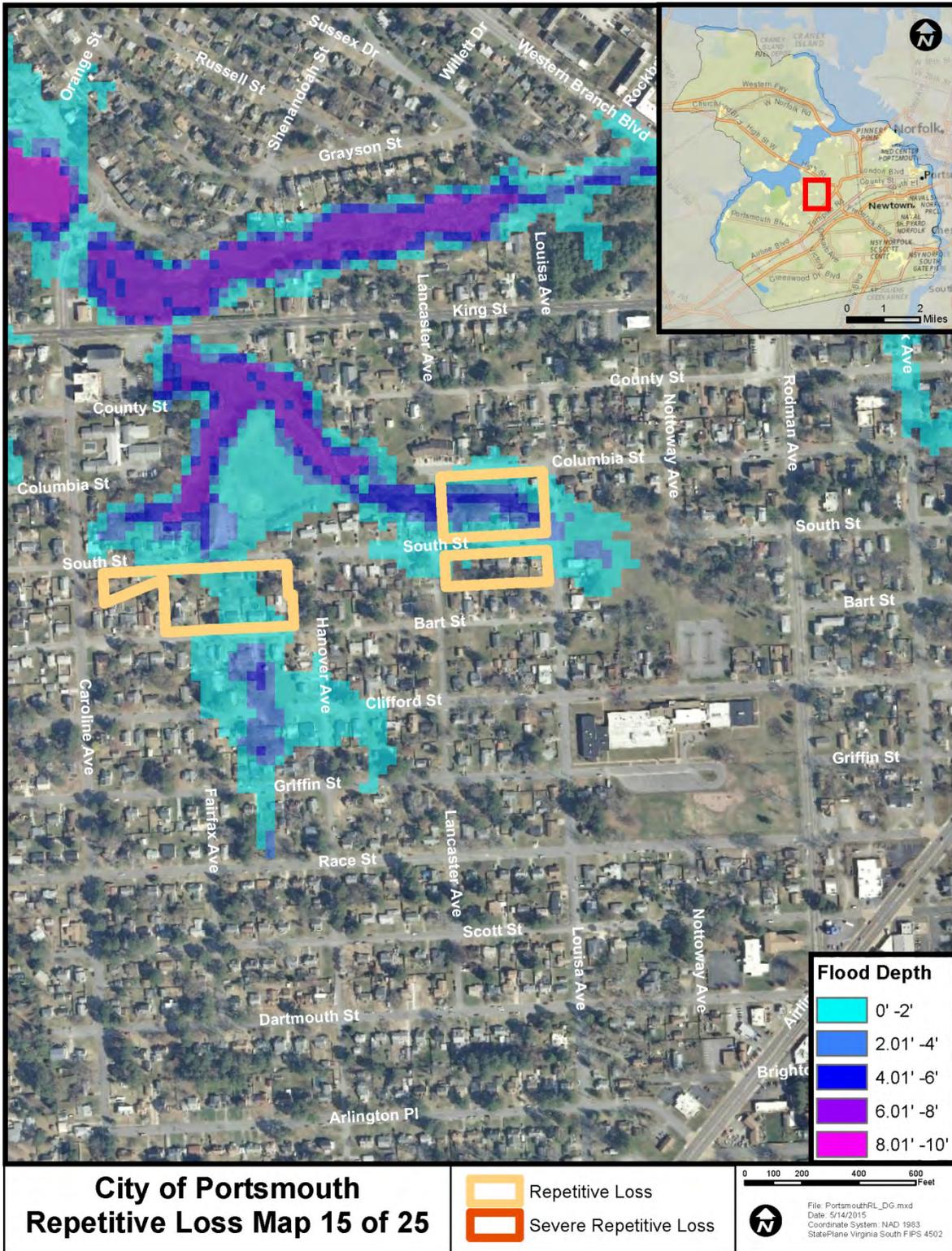
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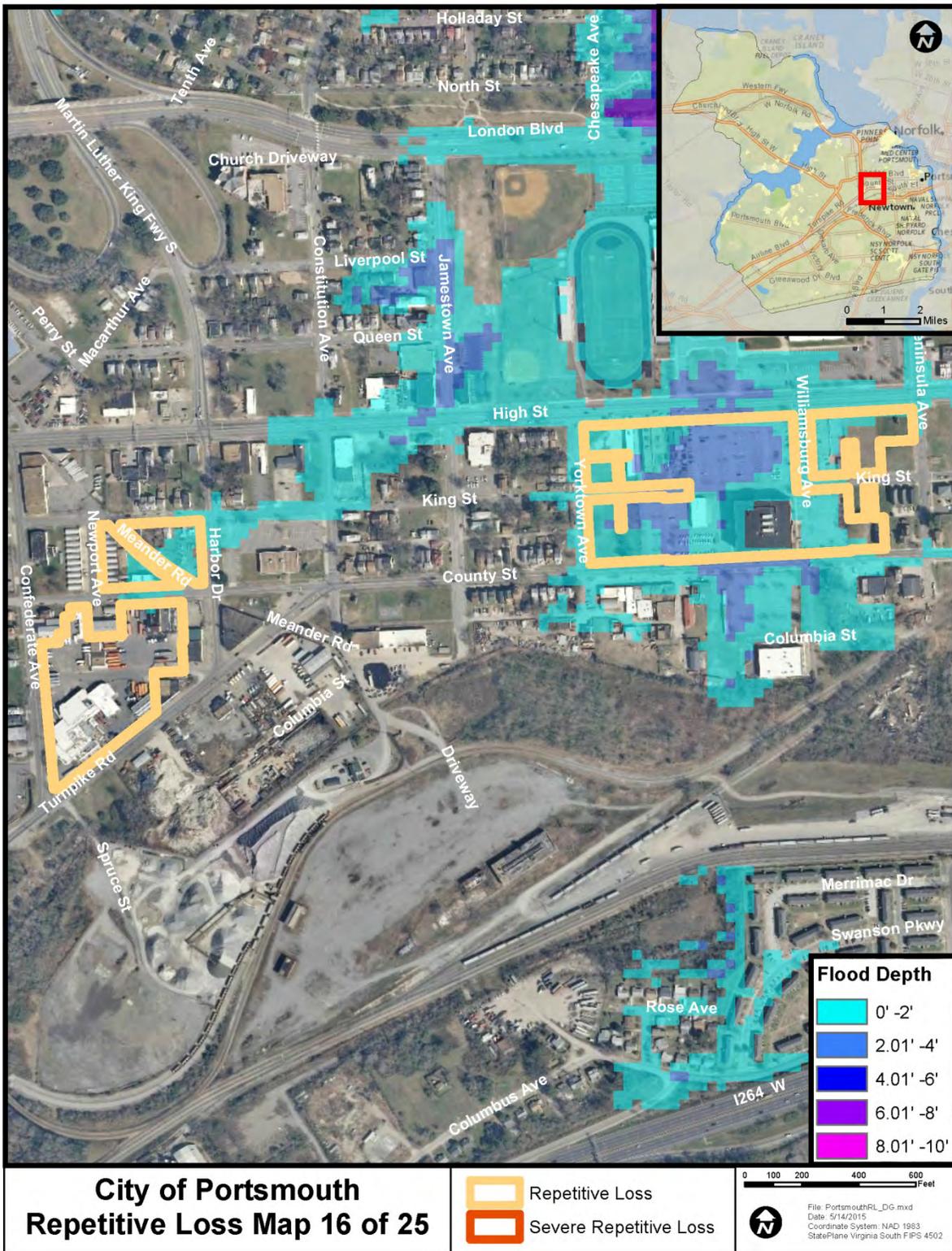

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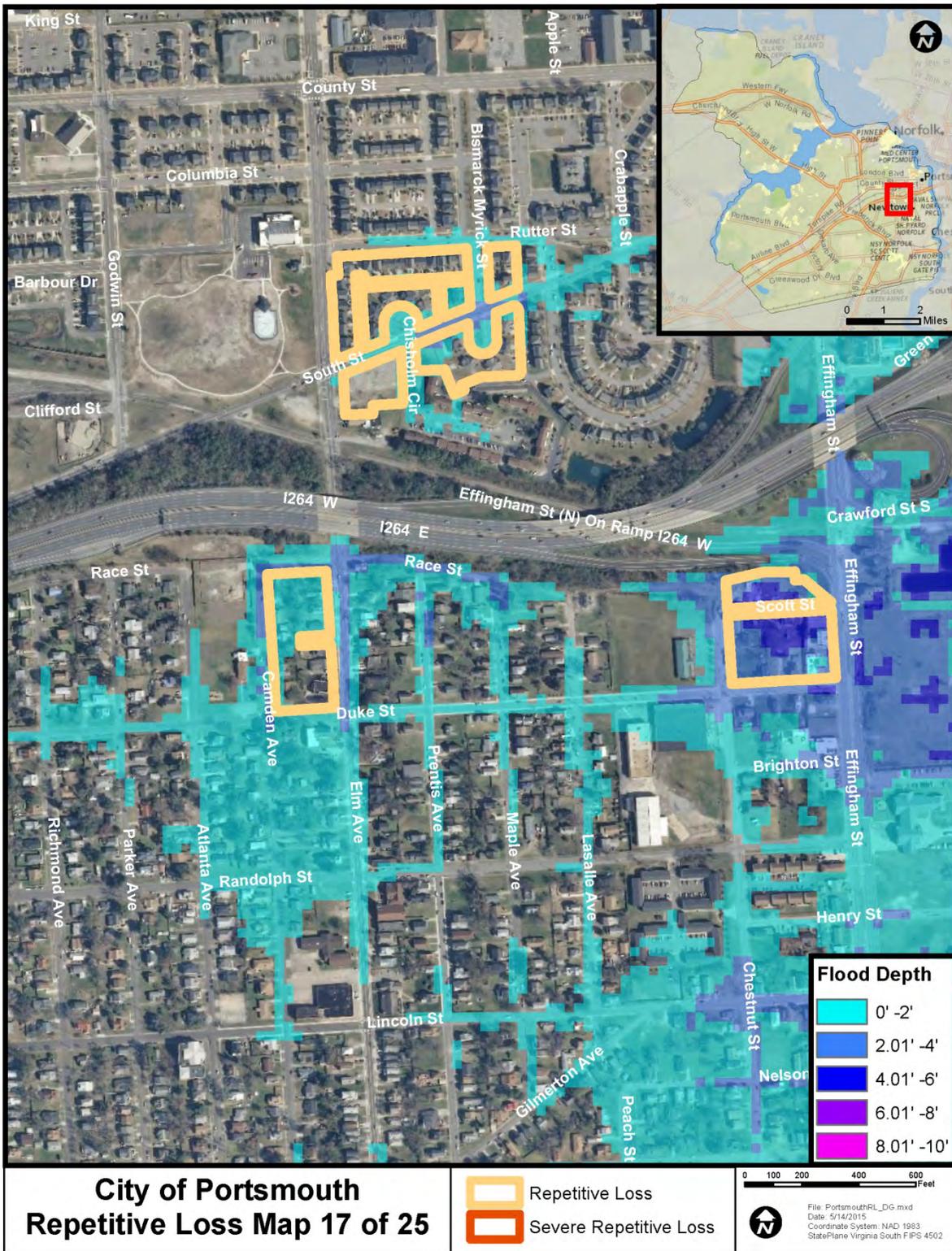


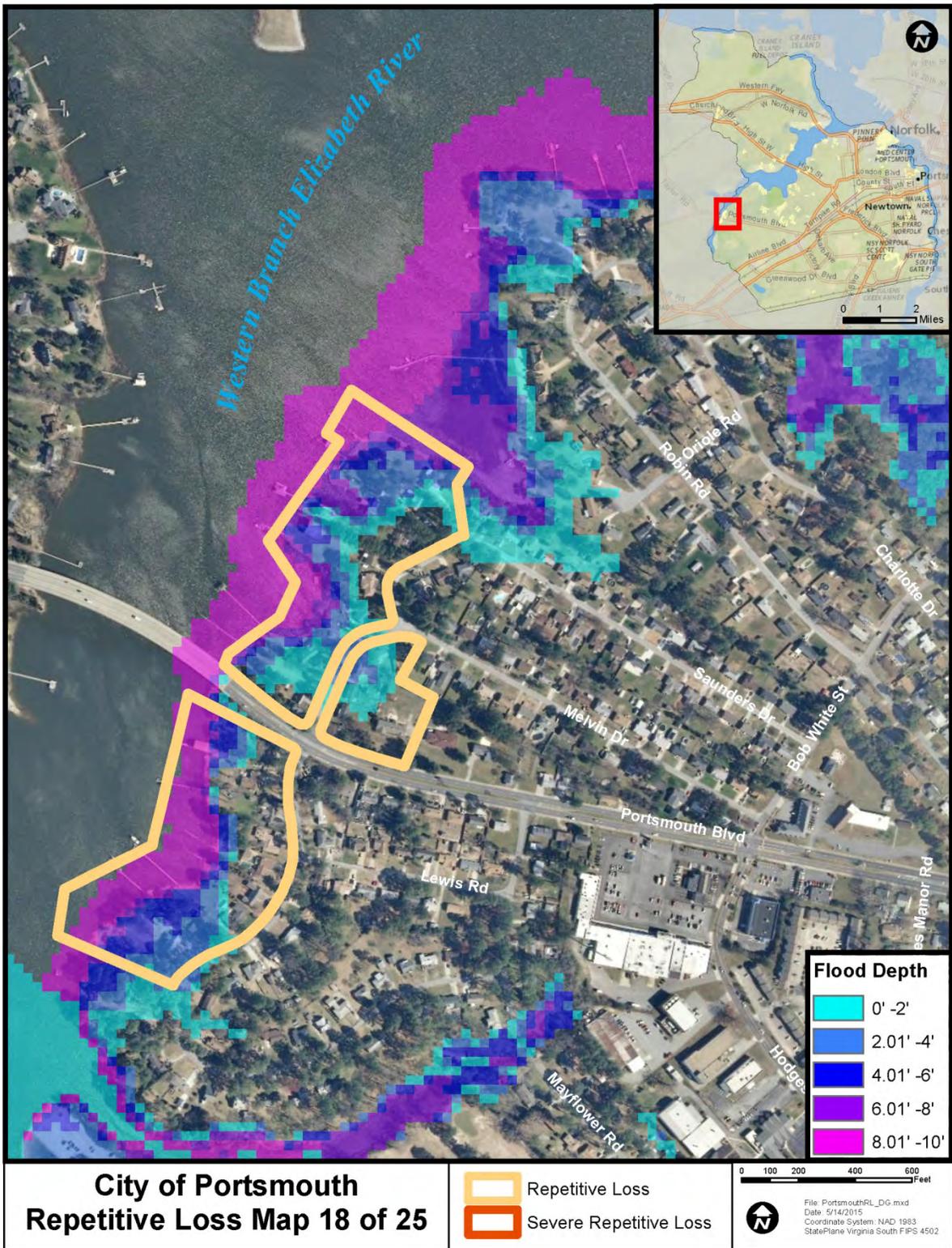


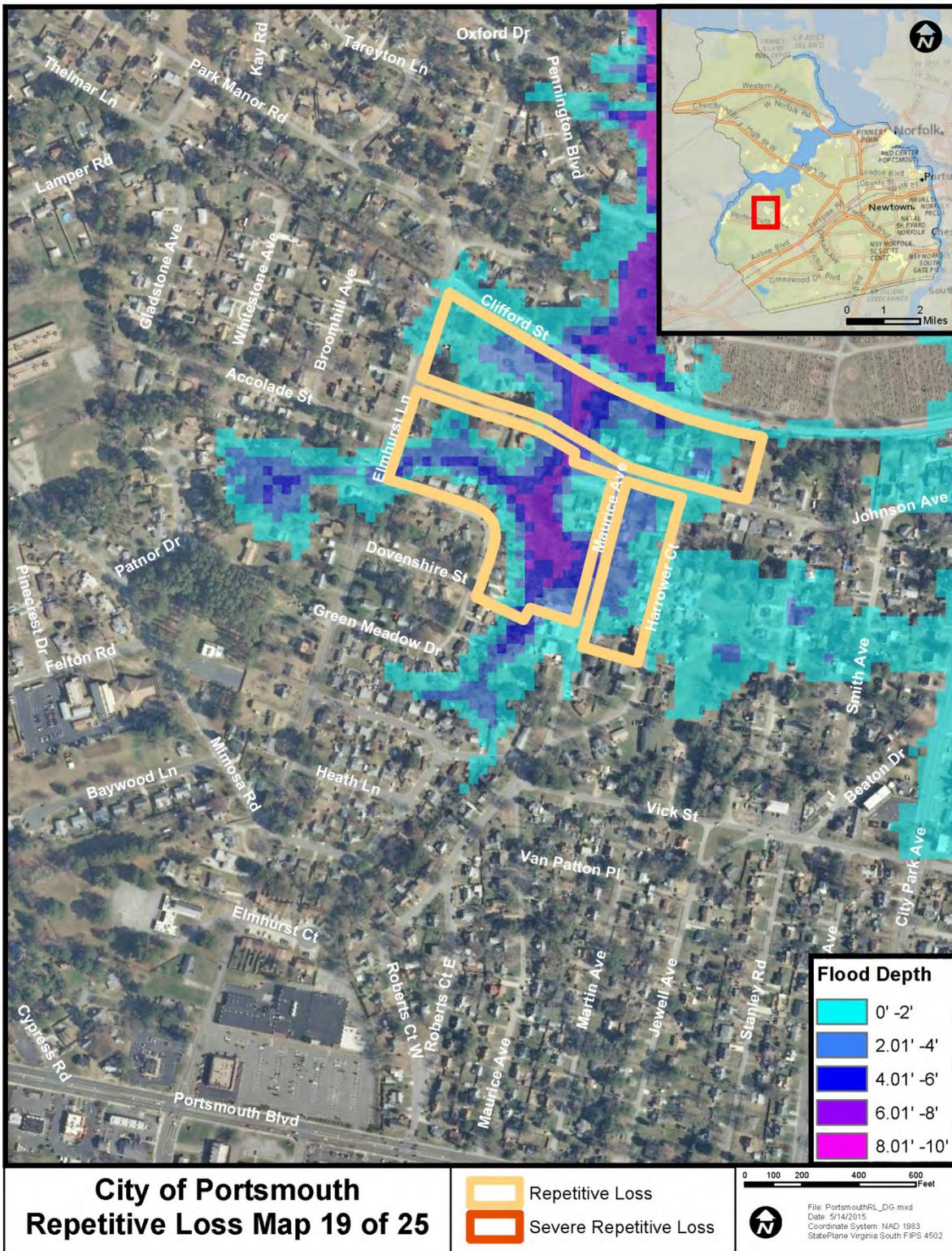


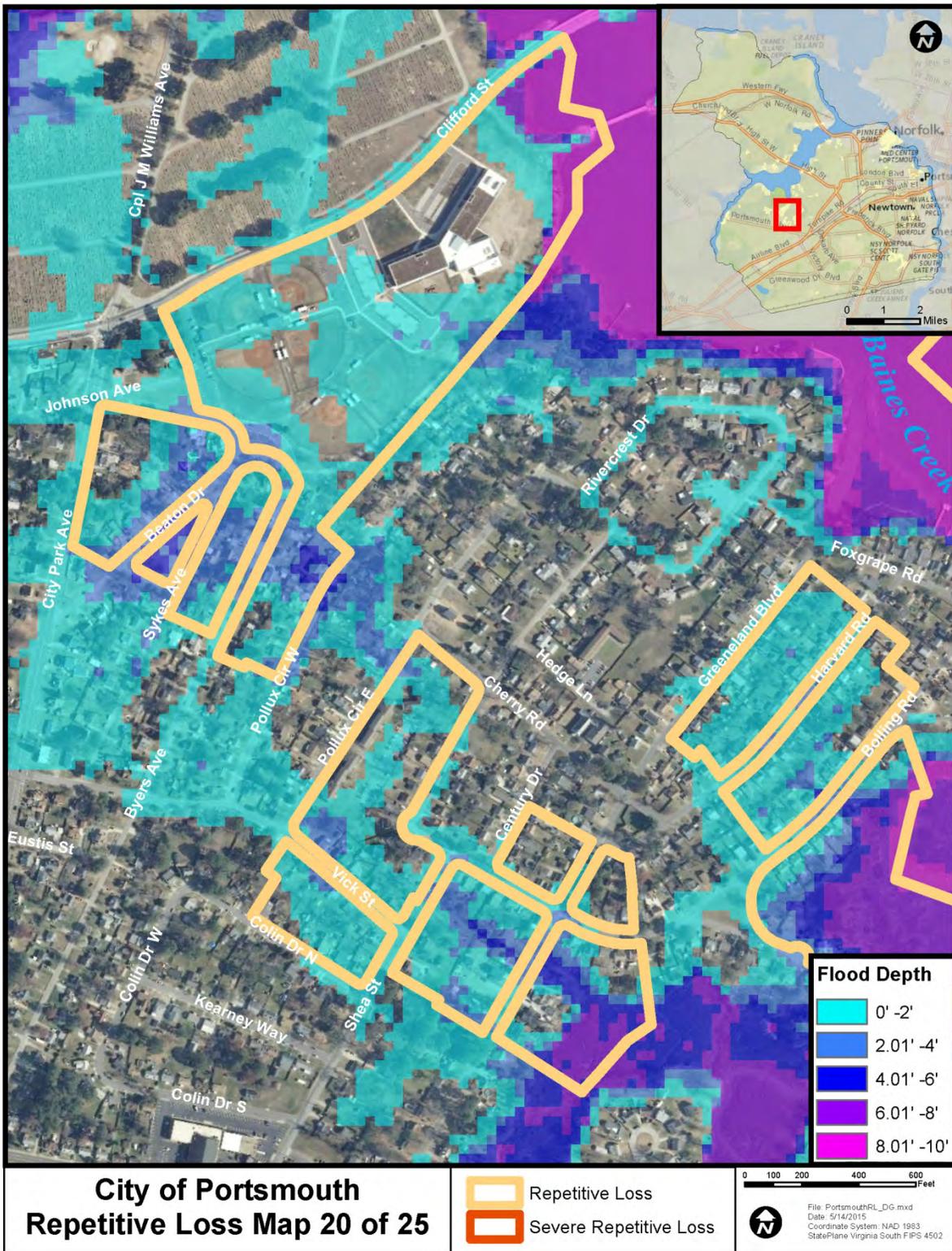


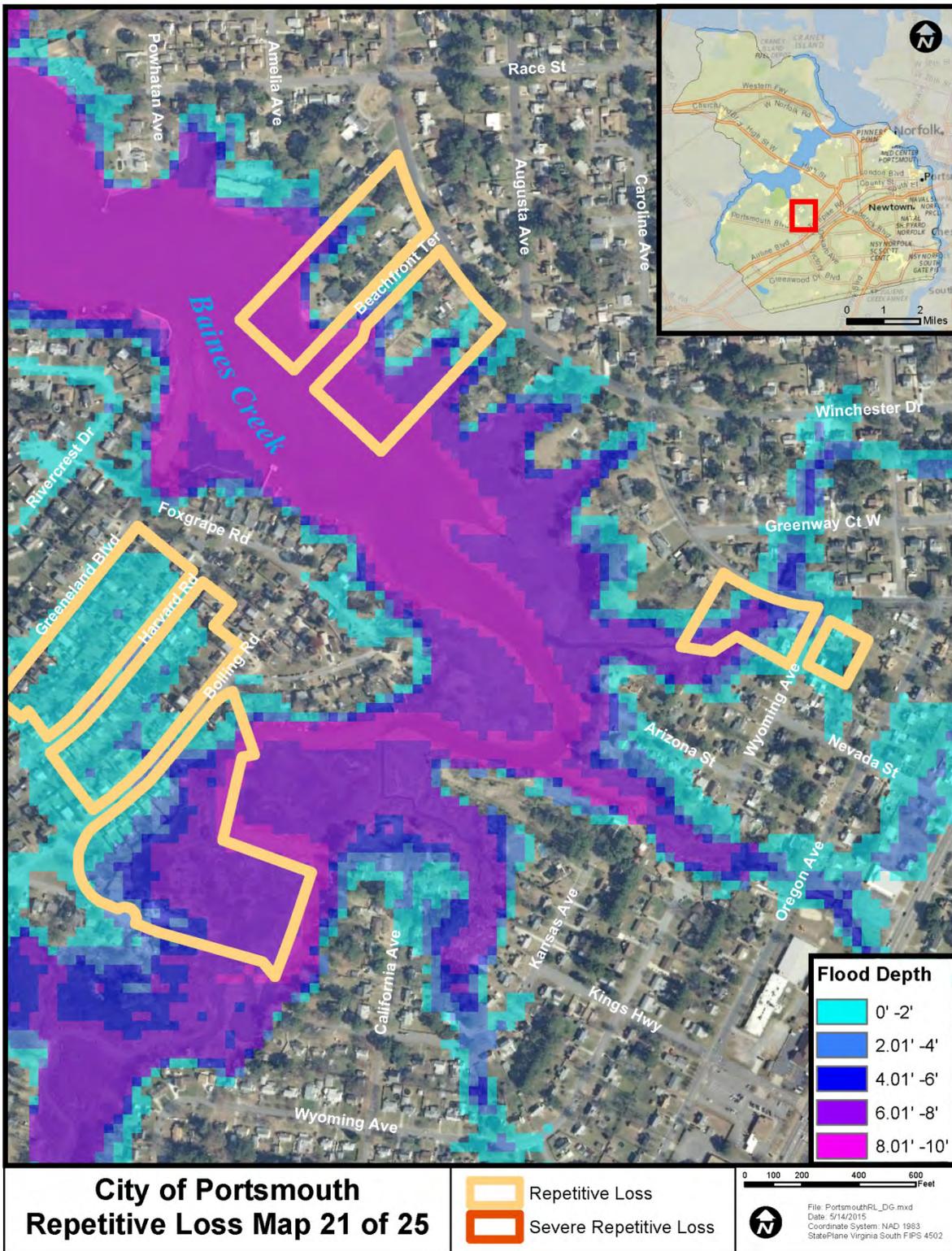


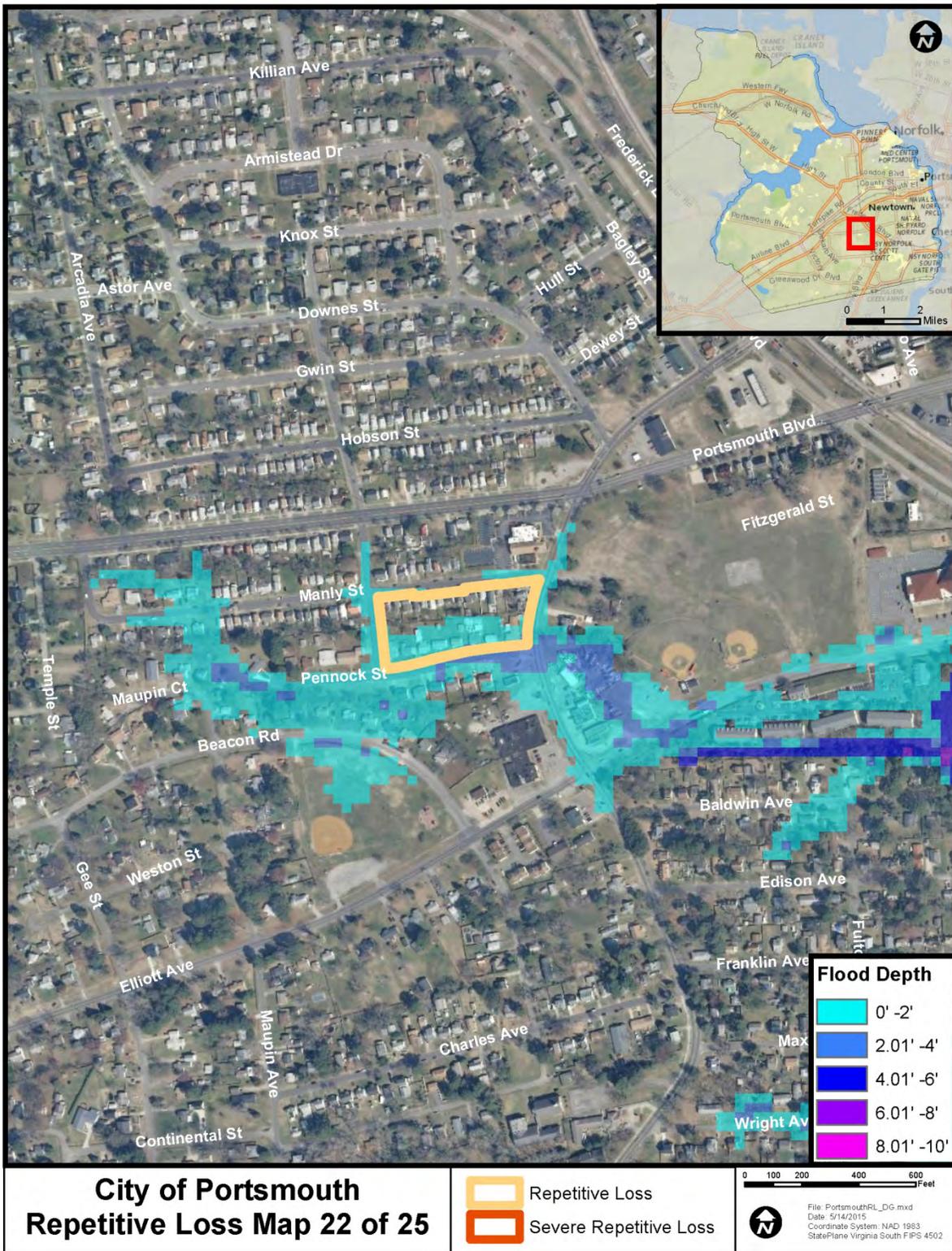


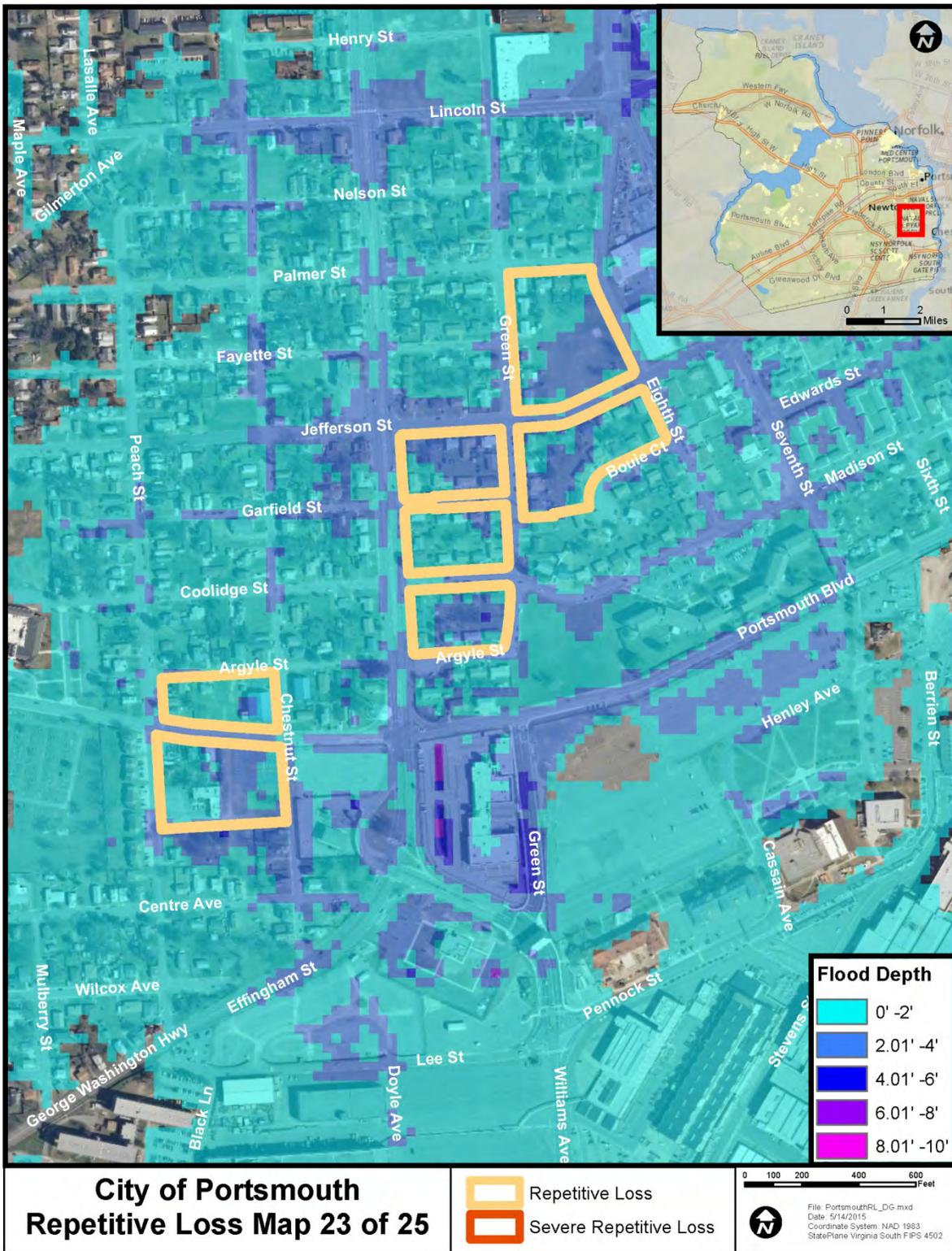


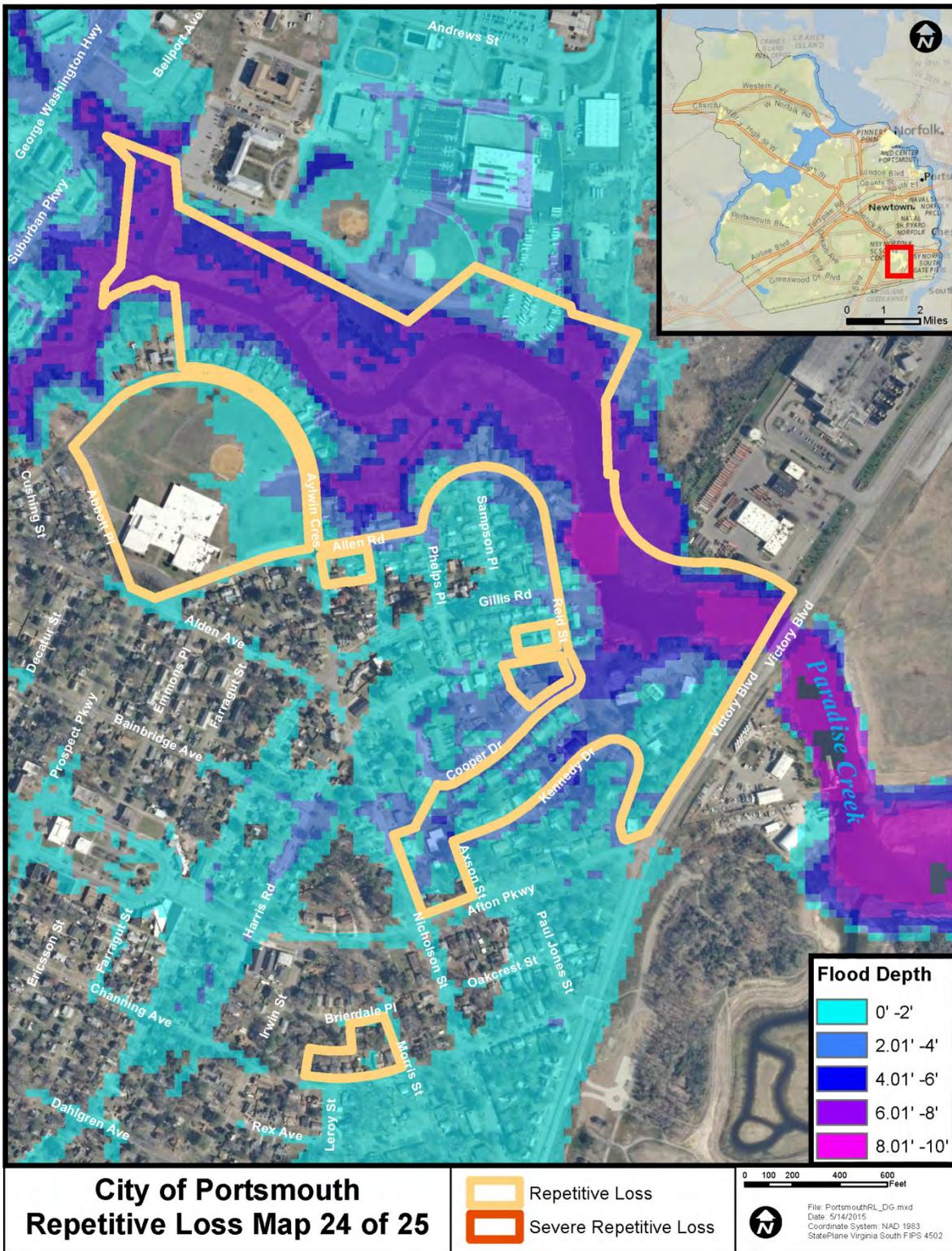














I. Status Update for the 2010 Floodplain Management Plan

The following is a status of the action items contained in the 2010 Floodplain Management Plan. The items are listed in the order they appeared in the plan.

Proposed Actions in the Plan

1. Prepare or obtain pamphlets for distribution

In late September 2010 the 2010 Pamphlet was completed and mailed to Real Estate Agents, Insurance Agents, Lending agencies, Repetitive Loss Property owners and owners of property in the flood hazard zones. During late 2010 and the entire 2011 to date the pamphlet has been distributed to rental units as inspections were completed to advise tenants of the dangers and need to be prepared from floods.

During late 2011, 2012 and 2013 to date the pamphlet prepared in 2010 has continued to be distributed to all rental units as inspections were completed to advise tenants of the dangers and the need to be prepared from floods.

During the summer of 2012 a second pamphlet was prepared to assist property owners prepare their buildings to reduce flood damages. This pamphlet was mailed mid August to all properties that have a building in the hazard area.

A third pamphlet is being prepared by the Fire Department to mail to all properties in or near the hazard area on evacuation tips and what is needed to shelter in place. This pamphlet is planned on being mailed in September of 2012.

2. Determine which public fairs and festivals should be targeted for staff participation and information distribution.

2010 Hurricane/Flood Damage Pamphlets were distributed during the Historic Home Expo April 2011 and April 2012.

3. Attend Civic League meetings in areas of potential flood hazard and present flood related information.

Civic Leagues were notified of the flood program and staff willingness to speak August 2011, May 2012 and May 2013. Staff has attended to date 7 civic/neighborhood meetings.

4. Obtain updated mailing lists for properties covered by flood insurance or having filed flood damage claims and distribute information by mail.

Mailing lists for Real Estate Agents, Insurance Agents, Lending agencies, Repetitive Loss Property owners was updated August 2011, May 2012 and May 2013 to reflect new owners and businesses. Still awaiting a listing of the properties with flood insurance policies.

5. Obtain updated maps for properties located in the Flood Hazard Areas and notify owners/residents of location and potential for damage and availability of Flood Insurance.

GIS maps for, Repetitive Loss Property owners and owners of property in the flood hazard zones were updated annually to reflect new owners and businesses. Information letters notifying all properties in the hazard zone were mailed November 2011, April 2012 and May 2013.

6. Distribute flood hazard related information to the general public through various means to include postcards, electronic billboards, and notices in utility bills.

In addition to the pamphlets, notices and letters mailed to property owners, inspection staff is leaving a copy of the Flood Information Pamphlet at all rental properties inspected. Copies have also been made available at the public counters in Planning and Inspections.

7. Continue stocking the library system with flood related books and publicize the activity.

Action is continuing. In addition an online library has been created that was advertised in the letters Real Estate Agents, Insurance Agents, Lending agencies, Repetitive Loss Property owners and owners of property in the flood hazard zones. The web address for this new service is <http://www.portsmouthva.gov/planning/flood.aspx>.

8. Notify Real Estate Community, Lending Institutions, and Insurance Companies of participation in the National Flood Insurance Program and Community Rating System Program.

Mailing lists for Real Estate Agents, Insurance Agents, Lending agencies, were updated annually to reflect new owners and businesses. Notices mailed June 2011, May 2012 and May 2013.

9. Complete an emergency evacuation plan under the auspices of the Department of Emergency Services with input from VDOT and with adoption by City Council.

This activity is currently underway.

10. Review plans for all new construction to insure they meet or exceed the requirements of state federal and local regulations.

This activity is ongoing.

11. Keep interactive map on the City's web site up-to-date as conditions and circumstances change and as regulations affecting mapping of floodplains change.

In addition to the interactive map being updated daily with subdivisions etc., on the City's flood information website a listing of all LOMAs has been created. Again, this website can be found at <http://www.portsmouthva.gov/planning/flood.aspx>.

12. Modify mapping to fit a format to be included on the City of Portsmouth Flood Preparedness Web Page.

Completed.

13. Provided staff training on the requirements of the National Flood Insurance Program, local floodplain regulations, elevation certificates, flood vents, substantial damage and substantial improvement.

Provided staff training on Elevation Certificates in April 2011, Elevation Certificates on vents in crawl space in February 2012, Elevation Certificates on vents in crawl space in February 2013. Staff training on Biggert-Waters 2012 completed June 2013.

14. Identify and fund drainage improvement projects.

With the receipt of the current listing of flood claims staff is overlaying the drainage system to determine where storm drains are back flooding neighborhoods. With this information staff will then propose a series of modifications to the drainage system to include tide gates.

Staff completed overlaying the drainage system with flood claims and hired an outside engineering firm to determine the feasibility and success of installing tide gauges on 24 outfalls. Initial findings revealed that a number of the outfalls are already fitted with tide gates but needed maintenance to operate properly. These gates have all been repaired. One outfall was identified as needing a flood gate and staff is currently preparing a price for this job. Finally two outfalls were identified as needing additional study. Because these outfalls control approximately 25% of the drainage system the perimeters of the additional study are being prepared and expectation is the additional study will begin in October of 2012. Finally the last flood gate was installed on the Crawford Street project.

15. Continue to identify all repetitive loss structures within the city.

Completed based on the most recent listing of claims received. In the repetitive loss AREAS there are now over 2,500 properties that are notified.

16. Continue to notify all repetitive loss structures of status and the potential of becoming a substantially damaged structure with the next event.

Completed each year.

17. Review Repetitive Loss areas and identify new repetitive loss properties, sources of flooding and potential mitigation strategies.

Completed each year.

18. Provide the necessary maintenance to the storm drain system to reduce the potential of flooding from rain or storm events.

In addition to the item in #14, Public Works staff is continuing to clean and improve all ditches, storm water lines and those outfalls that are affected by tidal waters.

19. Increase the educational activities to all citizens of the potential and effects of flooding in the city.

No additional actions for this year.

Floodplain Management Plan Future Actions

Short term Actions (to occur within the next 2 to 5 years as funding is available)

1. Protect water and sewer utility system from damage and interruption of services due to flood damages.
 - a. Raise the power outlet and meter stand at 2501 Sterling Point Drive to an elevation of 9.5 on the 1988 NAVD

No action this year.

- b. Locate other city owned power outlet and meter stands and raise to an elevation of 9.5 on the 1988 NAVD.

No action this year.

- c. Raise all generators for water and sewage pumping stations to an elevation of 9.5 on the 1988 NAVD.

All new pump stations and remodeled stations are installing switching gears to allow rapid connection of generators or on site generators. Existing pump stations are being outfitted with switching gears of auxiliary pump connections. This work is completed for existing stations.

2. Prepare an education segment to be aired on the City Channel 48 during the hurricane and Nor'easter storm season.

Staff has prepared a list of ten questions and answers that will be asked by Planning Commission members and answered by various staff members. Staff has not been able to schedule the filming of this program and will continue to work on the project in the coming year.

3. Compile a list of inexpensive steps homeowners can take to reduce flood damage.

Completed.

4. Once the Storm Drainage study is complete and adopted by City Council, include the report, recommendations and actions into this document's appendix.

No action on this item.

5. Map streets that routinely flood during rain events. Identify the cause of the flooding and develop measures that reduce the flooding.

A listing of streets is being developed with the assistance of the Fire Department, City Engineering and Public Works.

6. Map streets that would be affected by storm surges and develop measures that reduce the flooding.

A listing of streets is being developed.

7. Determine, based on current information an expected sea level rise for the next 100 years.

Completed based on the sea level rise of 2, 4, 6 and 8 feet.

8. Prepare infrastructure plans utilizing sea level rise as a determining and budget factor.

No action on this item.

9. Prepare a grant application to address severely repetitive loss structures.

While a grant has not been prepared, staff has been able to, through the use of ICCF funds, reduce the number of Severely Repetitive Loss structures from 18 to 11.

10. Review "Best Practices" of other communities to remain abreast of current floodplain management activities.

Staff will be attending the newly created VA CRS group.

11. Map commercial operations that store hazardous materials and that are in the flood hazard areas.

The Fire Marshall's has provided the initial listing of properties that store materials or store hazardous materials. This listing has been compared to the FIRM and a listing of properties in the hazard area created and mapped. Staff will continue to update this map and listing as information becomes available.

12. Prepare evacuation policies that include actions for disabled individuals.

No action on this item.

13. Require all requests for homes for the aged, nursing homes, and homes for disabled and the like to have an emergency operations plan.

Policy has been put into place for the Planning Department for Use Permits and Social Services for certification. Addition meetings to refine this process are scheduled for this fall.

Long Term Actions (to occur within the 5 to 10 years as funding is available)

1. Prepare a repetitive loss strategy to address flooding condition in all repetitive loss neighborhoods.

No action on this item.

2. Increase the ability of the school system to provide shelters/temporary housing for flood victims.

No action on this item.

3. Provide protection from surge flooding for the downtown, Olde Towne, Westhaven and Cradock sections of the city.

Olde Towne section protection has been completed. A review of other neighborhoods will begin as funding sources are identified.

4. Continue with existing storm drainage evaluation and planning currently underway under the direction of the City Engineer.

Continuing.

5. Implement measures that reduce street flooding during rain events.

Staff is completing a study to identify those sections of city streets that flood and the reasons. Once identified staff can then began formulating a strategy to reduce this type of flooding as well as inform the public of the areas to avoid during flooding.

6. Identify and fund drainage improvement projects.

As identified in #14 above, Staff completed overlaying the drainage system with flood claims and hired an outside engineering firm to determine the feasibility and success of installing tide gauges on 24 outfalls. Initial findings revealed that a number of the outfalls are already fitted with tide gates but needed maintenance to operate properly. These gates have all been

repaired. One outfall was identified as needing a flood gate and staff is currently preparing a price for this job. Finally two outfalls were identified as needing additional study. Because these outfalls control approximately 25% of the drainage system the perimeters of the additional study are being prepared and expectation is the additional study will begin in October of this year.

7. On a five year basis, determine the rate of sea level rise using the most accurate information available and amend plans accordingly.

Will be completed in 2015.

8. Prepare and adopt an overlay zoning district that addresses concerns of sea level rise.

Proposed to begin in 2015.

J. Flood Pamphlet

Flood and Hurricane Preparedness Guide



You are receiving this pamphlet because you own or live on property that is located in or near a **Special Flood Hazard Area**



DEPARTMENT OF NEIGHBORHOOD ADVANCEMENT
 801 CRAWFORD STREET • 4TH FLOOR
 PORTSMOUTH, VIRGINIA 23704

RETURN SERVICE REQUESTED



Portsmouth's Flood History

During severe storms, the City of Portsmouth is highly susceptible to coastal flooding because of its location adjacent to the Elizabeth and James Rivers. Additionally, non-tidal related flooding can occur due to flat topography street drainage and also low land elevations. Many hurricanes, nor'easters, and tropical storms drive river water inland and flood streets and property. Portsmouth's history includes storms that have caused significant flood damage and loss of life. Since 1735, Portsmouth has been affected by severe storms, on the average, once every 8 years. The August 1933 hurricane caused the highest flood on record in the area with waters reaching 8 feet above mean sea level. This flood caused \$5 million in damage with 15 lives lost. A nor'easter that blew into town in 1962 caused flood waters to reach 7.5 feet above mean sea level and caused \$1.4 million in damage. More recent storms include Hurricane Isabel in 2003 and the November 2009 Nor'easter ("Nol'ida"). Isabel produced a storm surge approximately one foot below the base flood elevation, while the November 2009 storm had tide heights within a few inches of the 100 year storm level. Although we have not experienced the same catastrophic flooding caused by storms such as Hurricanes Katrina and Rita and Superstorm Sandy, we are still at risk. Just because you haven't experienced a flood in the past, doesn't mean you won't in the future. Flood risk isn't just based on history. Please visit the City of Portsmouth flood information website at www.portsmouthva.gov/DNA/flood-program.aspx to learn about your risks and how to be better prepared. **Know Your Risk.**

What's New

The City of Portsmouth witnessed many changes during the past year. Some of the most notable are:

- New **Preliminary** Flood Insurance Rate Maps (FIRMs) released by FEMA January 2014. Projected effective date of new maps is Mid-2015.
- FEMA Coastal Study providing better evaluation of coastal flood hazards and risk. More detailed and complete hazard determination.
- Projected Higher Base Flood Elevations (EFE) for many areas in the City.

Visit the City of Portsmouth flood information website or call the Department of Neighborhood Advancement at 757-393-8522 for more information.

www.portsmouthva.gov/DNA/flood-program.aspx

City Drainage Maintenance

Portsmouth has a stormwater drainage system composed of both open drainage swales/ditches and closed stormwater structures such as stormwater inlets and piping segments. Maintenance of both the open and closed systems is very important. Creeks, ditches and storm inlets provide a place for water to flow and properly drain. If these systems are clogged with debris, flooding of streets and nearby properties can occur. Trash that is thrown from a vehicle, dropped on a parking lot, or dumped into a storm drain is carried by rain through the stormwater system and then into creeks, rivers and the Bay creating pollution that damages our creeks and rivers and harms fish and wildlife.



The Department of Public Works (757-393-8666) maintains all ditches and storm drain structures within the City that accept street drainage. This activity is performed routinely throughout the year. Citizens can assist by regularly keep those drainage ditches adjacent to their property not maintained by the City free of debris.

Benefits of Floodplains

Flood Protection and Erosion Control: Floodplains provide a river more room as it rises. They accommodate temporary storage of flood water, reducing flood peaks and erosion potential.

Improved Water Quality: When inundated with water, floodplains act as natural filters, removing excess sediment and nutrients.

Recharged Aquifers: Outside of a river's main channel, water flow is slowed and has more time to seep into the ground where it can replenish underground water sources.

Improved Wildlife Habitat: Floodplains are home to some of the most biologically rich habitats on Earth. They provide spawning grounds for fish and critical areas of rest and foraging for migrating waterfowl and birds.

Recreational Opportunities: Many outdoor recreational activities – like fishing, hunting, camping, biking, wildlife watching and boating – are made possible by and greatly enhanced by the natural processes of rivers and healthy floodplains.

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FLOOD SAFETY

Before the Flood

It is important to make plans before the flood arrives. Your advanced plan should include the following (at a minimum):

- Purchase flood insurance at least 30 days before the event and keep your policy and other important papers in a safe place such as a fire-proof box, safety deposit box, or waterproof container.
- Learn the safest route from your home in case you have to evacuate.
- Fill the gas tank of your automobile.
- Purchase sandbags, plywood, and plastic sheeting to protect your property. Never place sandbags directly adjacent to walls.
- Make arrangements for your pets.
- Create an emergency supply kit to include:
 - Fresh water to last seven days (one gallon per person per day)
 - Non-perishable food to last seven days with paper products and plastic serving utensils
 - One change of clothing and footwear per person
 - First aid kit with prescription medicines
 - Personal hygiene items
 - Portable radio (preferably a weather band radio) and flashlight with plenty of extra batteries
 - Extra set of car keys
 - Cash, preferably in small bills
 - Necessary items for infants, elderly, disabled family members and pets
 - A small basic toolkit



During the Flood

In Your Home

If you are in your home when it begins to flood, move to the second floor or to the roof. Do not try to swim to safety; floodwaters can move very rapidly. If time permits, turn off all utilities, particularly electricity and gas, and board up windows. Bring outdoor possessions inside the house.

In Your Vehicle

TURN AROUND. DON'T DROWN. (tadd.weather.gov) If you are in a vehicle during a flood, do not drive into standing water. Two feet of water can cause most vehicles to float. A majority of deaths occur because the driver didn't feel the water was that deep. If the vehicle stalls, abandon it.

Flood Warning System

The Portsmouth Fire Department is responsible for Emergency Preparedness and the Emergency Operation Center (EOC). In addition, they hold primary responsibility for the City's Emergency Alert System (EAS) which partners with local broadcasting stations to give citizens the most recent weather updates and precautions. The EAS is broadcast on television on WTKR, WAVY and WVEC. It is also broadcast on all manned 24-hour radio stations.

PREPAREDNESS INFORMATION LINKS

Portsmouth Department of Neighborhood Advancement
www.portsmouthva.gov/DNA

Portsmouth Emergency Operations Center
www.portsmouthva.gov/EOC

FloodSmart
www.floodsmart.gov

Federal Emergency Management Agency (FEMA)
www.fema.gov

FEMA Flood information
www.fema.gov/information-property-owners

National Flood Insurance Program
www.fema.gov/national-flood-insurance-program

FEMA Region III Coastal Analysis and Mapping
www.R3coastal.com

NOAA Flood Safety
www.floodsafety.noaa.gov

Red Cross
www.redcross.org

National Hurricane Center
www.nhc.noaa.gov

Individual Preparedness Guides
www.ready.gov/be-informed

Emergency Preparedness for Business
www.ready.gov/business/implementation/continuity

Protecting Your Property

Floodproofing is any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to property, structures, and their contents. The Department of Permits and Inspections should be contacted at 757-393-8531 in order to ensure that any proposed construction complies with City regulations. Examples of retrofitting include: elevating your home or business, relocating your home or business out of the floodplain, creating a levee adjacent to the walls of your structure or erecting a floodwall. In residential buildings, floodproofing of areas below the Base Flood Elevation (BFE) is not permitted. www.portsmouthva.gov/buildingofficial

What is a Floodplain?

A floodplain is any land area susceptible to being inundated by water from any source. When left in a natural state, floodplain systems store and dissipate floods without adverse impacts on humans, buildings, roads and other infrastructure. Simply put, floodplains are meant to flood.

Developing and Building in the Floodplain

Portsmouth City Code (Chapter 14) regulates development in the floodplain area. A permit is required for ALL construction and development (any manmade change) in areas designated as floodplain areas. An Elevation Certificate will be required be submitted for the property. City staff will take measures to ensure that improvements on existing structures and new construction are consistent with current regulations. Any illegal development in the floodplain should be reported to the Department of Permits and Inspections at 757-393-8531.



Substantial Improvement Requirements

In accordance with Chapter 14 of the Portsmouth City Code, buildings existing in the floodplain prior to November 26, 1991, with existing conditions not in accordance with the City Code, may be modified, altered, repaired, reconstructed or improved subject to the following conditions:

1. If the improvements or repairs to a structure amount less than 50% of its market value, it shall be elevated and/or flood-protected to the greatest extent possible, as determined by the Permits and Inspections Department.
2. If the structure is improved or repaired to an extent or amount greater than 50% of its market value, the structure shall conform to the current Floodplain regulations in City Code as well as the current Virginia State-wide Building Code.

What Flood Zone Am I In?

Everyone is in a flood zone of some kind. There are four major zones: AE, VE, X Shaded, and X Unshaded. Zone AE is a high-risk flood area. Zone VE is a high-risk area with the additional risk of wave action. Zone X Shaded is an area of moderate flood risk and Zone X Unshaded is considered the area of minimal flood risk. For detailed descriptions of the different flood zones, please visit the City of Portsmouth's flood information website. To determine the flood zone for your property, you can consult a flood map. These maps, known as Flood Insurance Rate Maps (FIRMs), indicate high-risk flood areas (Flood Zones AE and VE) in Portsmouth. Digital maps may be viewed at on the City's flood information website and paper copies may be viewed in the Department of Neighborhood Advancement on the 4th floor of City Hall. Additional flood materials can also be found at the main branch of the Portsmouth Public Library located at 601 Court Street and in the Department of Neighborhood Advancement on the 4th Floor of City Hall. 757-393-8522



Flood Insurance

Flood insurance is available through the National Flood Insurance Program (NFIP). Locally, this insurance is administered through casualty insurance agents and brokers. Homeowners and business owners should check with their local insurance company of choice. Building owners can insure both the structure and contents. Renters can insure the contents of their dwelling. Mobile homeowners can be insured if located on a permanent foundation and anchored to resist movement during a flood. You may be able to have your premium reduced if you obtain an Elevation Certificate from a licensed private surveyor.

Flood insurance is required by the federal regulations for structures either partially or completely in Flood Zone AE or VE and with a mortgage backed by federal programs. Owning flood insurance is necessary to maintain eligibility for any federal or federally related financial reconstruction or acquisition assistance.

The City's Flood Program is Helping YOU!

We are one of 22 Virginia localities actively participating in the NFIP's Community Rating System (CRS) Program. As a participant in the CRS program, we must perform regular flood prevention activities. Because of this commitment to flood prevention, we have achieved a 5% discount (for our citizens in the flood hazard zones) on your flood insurance premiums! The Floodplain Management Plan adopted by City Council outlines our strategy for flood prevention for the coming years. This document is viewable at www.portsmouthva.gov/DNA/flood-program.aspx.

K. Flood Post Card

FEMA is revising the City's Flood Insurance Rate Maps

Why are the maps being updated?

A new coastal study has been completed by FEMA that integrates recent data with new technologies to provide more detailed and reliable information about the area's coastal flood risks. The map revision incorporates the new information so that residents, property owners, business owners, and community officials may understand their local flood risk and take action to keep people and property safe from floods.

Additional information on the FEMA Region III Coastal Study and new maps can be found at www.R3coastal.com



Department of Neighborhood Advancement
801 Crawford Street • 4th Floor
Portsmouth, Virginia 23704

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Know Your Risk

NEW Flood Maps and Flood Protection Information

www.portsmouthva.gov/DNA/flood-program.aspx

Printed copies of the preliminary Flood Maps can be viewed in the Department of Neighborhood Advancement on the 4th Floor of City Hall during normal business hours.



For questions or additional information, contact the Department of Neighborhood Advancement at 757-393-8522

L. Saffir-Simpson Hurricane Scale

Remember that the arrival of a storm center is preceded by strong winds and rain several hours before landfall.

According to the National Hurricane Center, the Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures. In the western North Pacific, the term "super typhoon" is used for tropical cyclones with sustained winds exceeding 150 mph.

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt 178-208 km/h	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt 209-251 km/h	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt or higher 252 km/h or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
National Weather Service National Hurricane Center (NHC, Saffir-Simpson Hurricane Wind Scale)		

M. Tropical Cyclone Names

Experience shows that the use of short, distinctive given names in written as well as spoken communications is quicker and less subject to error than the older more cumbersome latitude-longitude identification methods. These advantages are especially important in exchanging detailed storm information between hundreds of widely scattered stations, coastal bases, and ships at sea.

Atlantic Storm Names (NHC)					
2015	2016	2017	2018	2019	2020
Ana	Alex	Arlene	Alberto	Andrea	Arthur
Bill	Bonnie	Bret	Beryl	Barry	Bertha
Claudette	Colin	Cindy	Chris	Chantal	Cristobal
Danny	Danielle	Don	Debby	Dorian	Dolly
Erika	Earl	Emily	Ernesto	Erin	Edouard
Fred	Fiona	Franklin	Florence	Fernand	Fay
Grace	Gaston	Gert	Gordon	Gabrielle	Gonzalo
Henri	Hermine	Harvey	Helene	Humberto	Hanna
Ida	Ian	Irma	Isaac	Imelda	Isaias
Joaquin	Julia	Jose	Joyce	Jerry	Josephine
Kate	Karl	Katia	Kirk	Karen	Kyle
Larry	Lisa	Lee	Leslie	Lorenzo	Laura
Mindy	Matthew	Maria	Michael	Melissa	Marco
Nicholas	Nicole	Nate	Nadine	Nestor	Nana
Odette	Otto	Ophelia	Oscar	Olga	Omar
Peter	Paula	Philippe	Patty	Pablo	Paulette
Rose	Richard	Rina	Rafael	Rebekah	Rene
Sam	Shary	Sean	Sara	Sebastien	Sally
Teresa	Tobias	Tammy	Tony	Tanya	Teddy
Victor	Virginie	Vince	Valerie	Van	Vicky
Wanda	Walter	Whitney	William	Wendy	Wilfred

Since 1953, Atlantic tropical storms had been named from lists originated by the National Hurricane Center. They are now maintained and updated through a strict procedure by an international committee of the World Meteorological Organization.

The six lists above are used in rotation and re-cycled every six years, i.e., the 2014 list will be used again in 2020. The only time that there is a change in the list is if a storm is so deadly or costly that the future use of its name on a different storm would be inappropriate for reasons of sensitivity. If that occurs, then at an annual meeting by the WMO committee (called primarily to discuss many other issues) the offending name is stricken from the list and another name is selected to replace it. Several names have been retired since the lists were created.

If a storm forms in the off-season, it will take the next name in the list based on the current calendar date. For example, if a tropical cyclone formed on December 28th, it would take the name from the previous season's list of names. If a storm formed in February, it would be named from the subsequent season's list of names.

In the event that more than twenty-one named tropical cyclones occur in the Atlantic basin in a season, additional storms will take names from the Greek alphabet.

N. Definitions

ADVISORY: Official information issued by tropical cyclone warning centers describing all tropical cyclone watches and warnings in effect along with details concerning tropical cyclone locations, intensity and movement, and precautions that should be taken. Advisories are also issued to describe: (a) tropical cyclones prior to issuance of watches and warnings and (b) subtropical cyclones.

BEST TRACK: A subjectively-smoothed representation of a tropical cyclone's location and intensity over its lifetime. The best track contains the cyclone's latitude, longitude, maximum sustained surface winds, and minimum sea-level pressure at 6-hourly intervals. Best track positions and intensities, which are based on a post-storm assessment of all available data, may differ from values contained in storm advisories. They also generally will not reflect the erratic motion implied by connecting individual center fix positions.

CENTER: Generally speaking, the vertical axis of a tropical cyclone, usually defined by the location of minimum wind or minimum pressure. The cyclone center position can vary with altitude. In advisory products, refers to the center position at the surface.

CENTER / VORTEX FIX: The location of the center of a tropical or subtropical cyclone obtained by reconnaissance aircraft penetration, satellite, radar, or synoptic data.

CENTRAL NORTH PACIFIC BASIN: The region north of the Equator between 140W and the International Dateline. The Central Pacific Hurricane Center (CPHC) in Honolulu, Hawaii is responsible for tracking tropical cyclones in this region.

CLOSEST POINT OF APPROACH: Point where hurricane eye makes closest contact to shore without making landfall.

COASTAL FLOOD WARNING: A warning that significant wind-forced flooding is to be expected along low-lying coastal areas if weather patterns develop as forecast.

COASTAL FLOOD WATCH: An alert that significant wind-forced flooding is to be expected along low-lying coastal areas if weather patterns develop as forecast.

CYCLONE: An atmospheric closed circulation rotating counter-clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

DIRECT HIT: A close approach of a tropical cyclone to a particular location. For locations on the left-hand side of a tropical cyclone's track (looking in the direction of motion), a direct hit occurs when the cyclone passes to within a distance equal to the cyclone's radius of maximum wind. For locations on the right-hand side of the track, a direct hit occurs when the cyclone passes to within a distance equal to twice the radius of maximum wind. Compare indirect hit, strike.

EMERGENCY OPERATIONS CENTER (EOC): The city facility that serves as a central location for the coordination and control of all emergency preparedness and response.

EL NINO: A warming of Pacific Ocean waters near the Equator that typically occurs every 3 to 7 years. Such an event dictates a shift in "normal" weather patterns.

EMERGENCY BROADCAST SYSTEM: A system designed to permit government officials to issue up-to-date and continuous emergency information and instructions to the public in a threatened or actual emergency.

EMERGENCY PUBLIC INFORMATION: Information disseminated primarily, but not unconditionally, at the time of an emergency frequently includes actions, instructions and direct orders.

EMERGENCY PUBLIC SHELTER: Generally a public school or other such structure designated by city officials as a place of refuge.

EXPLOSIVE DEEPENING: A decrease in the minimum sea-level pressure of a tropical cyclone of 2.5 mb/hr for at least 12 hours or 5 mb/hr for at least six hours.

EVACUATION TIME: The lead time that a populated coastal area must have to safely relocate all residents of vulnerable areas from an approaching hurricane. This time can also be perceived as the necessary amount of time between the local official evacuation order and the arrival of sustained gale force winds and/or flooding.

EXTENT OF EVACUATION: The identification of vulnerable people to evacuate based on estimated damage and/or homes susceptible to hurricane force winds.

EXTRATROPICAL: A term used in advisories and tropical summaries to indicate that a cyclone has lost its tropical characteristics. The term implies both poleward displacement of the cyclone and the conversion of the cyclone's primary energy source from the release of latent heat of condensation to baroclinic (the temperature contrast between warm and cold air masses) processes. It is important to note that cyclones can become extratropical and still retain winds of hurricane or tropical storm force.

EYE: The roughly circular area of comparatively light winds that encompasses the center of a severe tropical cyclone. The eye is either completely or partially surrounded by the eyewall cloud.

EYEWALL / WALL CLOUD: An organized band or ring of cumulonimbus clouds that surround the eye, or light-wind center of a tropical cyclone. Eyewall and wall cloud are used synonymously.

FLOOD WARNING: The expected severity of flooding (minor, moderate or major) as well as where and when the flooding will begin.

FORWARD SPEED: The rate of movement (propagation) of the hurricane eye in mph or knots

FUJIWHARA EFFECT: The tendency of two nearby tropical cyclones to rotate cyclonically about each other.

GALE WARNING: Sustained winds 39-54 miles an hour (34-47 knots) either predicted or occurring. Note: Gale warnings are not normally issued during tropical cyclones.

HURRICANE / TYPHOON: A tropical cyclone in which the maximum sustained surface wind (using the U.S. 1-minute average) is 64 kt (74 mph or 119 km/hr) or more. The term hurricane is used for Northern Hemisphere tropical cyclones east of the International Dateline to the Greenwich Meridian. The term typhoon is used for Pacific tropical cyclones north of the Equator west of the International Dateline.

HURRICANE ADVISORIES: Notices numbered consecutively for each storm, describing the present and forecasted position and intensity. Advisories are issued at six-hour intervals at midnight, 6 a.m., noon, and 6 p.m., Eastern Daylight Time. Bulletins provide additional information. Each message gives the name, eye position, intensity and forecast movement of the storm.

HURRICANE PATH OR TRACK: Line of movement (propagation) of the eye through an area.

HURRICANE LOCAL STATEMENT: A public release prepared by local National Weather Service offices in or near a threatened area giving specific details for its county/parish warning area on (1) weather conditions, (2) evacuation decisions made by local officials, and (3) other precautions necessary to protect life and property.

HURRICANE/STORM PROBABILITIES: The National Weather Service issues hurricane/tropical storm probabilities in public advisories to realistically assess the threat of a hurricane or tropical storm hitting your community. The probabilities are defined as the chance in percent that the center of the storm will pass within approximately 65 miles of 44 selected locations from Brownsville, Texas, to Eastport, Maine.

HURRICANE SEASON: The portion of the year having a relatively high incidence of hurricanes. The hurricane season in the Atlantic, Caribbean, and Gulf of Mexico runs from June 1 to November 30. The hurricane season in the Eastern Pacific basin runs from May 15 to November 30. The hurricane season in the Central Pacific basin runs from June 1 to November 30.

HURRICANE WARNING: An announcement that hurricane conditions (sustained winds of 74 mph or higher) are *expected* somewhere within the specified coastal area. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the hurricane

warning is issued 36 hours in advance of the anticipated onset of tropical-storm-force winds.

HURRICANE WATCH: An announcement that hurricane conditions (sustained winds of 74 mph or higher) are *possible* within the specified coastal area. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the hurricane watch is issued 48 hours in advance of the anticipated onset of tropical-storm-force winds.

INDIRECT HIT: Generally refers to locations that do not experience a direct hit from a tropical cyclone, but do experience hurricane force winds (either sustained or gusts) or tides of at least 4 feet above normal.

INVEST: A weather system for which a tropical cyclone forecast center (NHC, CPHC, or JTWC) is interested in collecting specialized data sets (e.g., microwave imagery) and/or running model guidance. Once a system has been designated as an invest, data collection and processing is initiated on a number of government and academic web sites, including the Naval Research Laboratory (NRL) and the University of Wisconsin Cooperative Institute for Meteorological Satellite Studies (UW-CIMSS). The designation of a system as an invest does not correspond to any particular likelihood of development of the system into a tropical cyclone; operational products such as the Tropical Weather Outlook or the JTWC/TCFA should be consulted for this purpose.

LANDFALL: The intersection of the surface center of a tropical cyclone with a coastline. Because the strongest winds in a tropical cyclone are not located precisely at the center, it is possible for a cyclone's strongest winds to be experienced over land even if landfall does not occur. Similarly, it is possible for a tropical cyclone to make landfall and have its strongest winds remain over the water. Compare direct hit, indirect hit, and strike.

MAJOR HURRICANE: A hurricane that is classified as Category 3 or higher.

NATIONAL GEODETIC VERTICAL DATUM OF 1929 [NGVD 1929]: A fixed reference adopted as a standard geodetic datum for elevations determined by leveling. The datum was derived for surveys from a general adjustment of the first-order leveling nets of both the United States and Canada. In the adjustment, mean sea level was held fixed as observed at 21 tide stations in the United States and 5 in Canada. The year indicates the time of the general adjustment. A synonym for Sea-level Datum of 1929. The geodetic datum is fixed and does not take into account the changing stands of sea level. Because there are many variables affecting sea level, and because the geodetic datum represents a best fit over a broad area, the relationship between the geodetic datum and local mean sea level is not consistent from one location to another in either time or space. For this reason, the National Geodetic Vertical Datum should not be confused with mean sea level.

NOAA WEATHER RADIO: A 24-hour continuous broadcast of existing and forecasted weather conditions.

POST-STORM REPORT: A report issued by a local National Weather Service office

summarizing the impact of a tropical cyclone on its forecast area. These reports include information on observed winds, pressures, storm surges, rainfall, tornadoes, damage and casualties.

POST-TROPICAL CYCLONE: A former tropical cyclone. This generic term describes a cyclone that no longer possesses sufficient tropical characteristics to be considered a tropical cyclone. Post-tropical cyclones can continue carrying heavy rains and high winds. Note that former tropical cyclones that have become fully extratropical...as well as remnant lows...are two classes of post-tropical cyclones.

PRE-EYE LANDFALL TIME: The time before actual hurricane eye landfall within which evacuation cannot be carried out because of earlier effects, such as the inundation of evacuation routes from the storm surge or rainfall and the arrival of sustained gale force winds. It is composed of the time of arrival of sustained gale-force winds or the time roadway inundation from storm surge/rainfall begins, whichever comes first.

PRELIMINARY REPORT: Now known as the "Tropical Cyclone Report". A report summarizing the life history and effects of an Atlantic or eastern Pacific tropical cyclone. It contains a summary of the cyclone life cycle and pertinent meteorological data, including the post-analysis best track (six-hourly positions and intensities) and other meteorological statistics. It also contains a description of damage and casualties the system produced, as well as information on forecasts and warnings associated with the cyclone. NHC writes a report on every tropical cyclone in its area of responsibility.

PRESENT MOVEMENT: The best estimate of the movement of the center of a tropical cyclone at a given time and given position. This estimate does not reflect the short-period, small scale oscillations of the cyclone center.

PUBLIC INFORMATION OFFICER: A person appointed by a City Emergency Operations Center to be responsible for the formulating and coordinating of the dissemination of emergency public information with both the electronic and written media, ensuring that accurate information is being released to the general public.

RADIUS OF MAXIMUM WINDS: The distance from the center of a tropical cyclone to the location of the cyclone's maximum winds. In well-developed hurricanes, the radius of maximum winds is generally found at the inner edge of the eyewall.

RAPID DEEPENING: A decrease in the minimum sea-level pressure of a tropical cyclone of 1.75 mb/hr or 42 mb for 24 hours.

RELOCATED: A term used in an advisory to indicate that a vector drawn from the preceding advisory position to the latest known position is not necessarily a reasonable representation of the cyclone's movement.

REMNANT LOW: A post-tropical cyclone that no longer possesses the convective

organization required of a tropical cyclone...and has maximum sustained winds of less than 34 knots. The term is most commonly applied to the nearly deep-convection-free swirls of stratocumulus in the eastern North Pacific.

SAFFIR-SIMPSON HURRICANE WIND SCALE: The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 categorization based on the hurricane's intensity at the indicated time. The scale provides examples of the type of damage and impacts in the United States associated with winds of the indicated intensity.

SEVERE THUNDERSTORM WARNING: Indicates that severe thunderstorms have been sighted or indicated on radar.

SEVERE THUNDERSTORM WATCH: Indicates that conditions are favorable for lightning, damaging winds greater than 58 miles an hour and hail and/or heavy rainfall.

SHELTER PERIOD: The period in which people are forced to evacuate their homes. This time may vary from several hours to a couple of days depending upon the severity of the hurricane.

SLOSH (Sea, Lake and Overland Surges from Hurricanes): A computerized model that is able to estimate the overland tidal surge heights and winds that result from hypothetical hurricanes with selected characteristics in pressure, size, forward speed, track and winds. The resultant tidal surge is then applied to a specific locale's shoreline, incorporating the unique bay and river configurations, water depths, bridges, roads and other physical features. The model estimates open coastline heights as well as surge heights over land, thus predicting the degree of propagation or run-up of the surge into inland areas.

SMALL CRAFT ADVISORY: A warning of winds from 20 to 33 knots or for sea conditions either forecasted or occurring that are considered potentially hazardous to small boats in coastal waters.

SPECIAL MARINE WARNING: A warning for hazardous weather conditions, usually short and not adequately covered by existing marine warnings. Such conditions include sustained winds or gusts of 35 knots or more for 2 hours or less.

SQUALL: A sudden increase of wind speed by at least 18 mph and rising to 25 mph or more and lasting for at least one minute.

STORM SURGE: An abnormal rise in sea level accompanying a hurricane or other intense storm, and whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone. Storm surge is usually estimated by subtracting the normal or astronomic high tide from the observed storm tide.

STORM TIDE: The actual level of sea water resulting from the astronomic tide combined with the storm surge.

STORM WARNING: A warning of 1-minute sustained surface winds of 48 kt (55 mph or 88 km/hr) or greater, either predicted or occurring, not directly associated with tropical cyclones.

STRIKE: <http://www.nhc.noaa.gov/gifs/strikezone.gif> For any particular location, a hurricane strike occurs if that location passes within the hurricane's strike circle, a circle of 125 n mi diameter, centered 12.5 n mi to the right of the hurricane center (looking in the direction of motion). This circle is meant to depict the typical extent of hurricane force winds, which are approximately 75 n mi to the right of the center and 50 n mi to the left.

SUBTROPICAL CYCLONE: A non-frontal low pressure system that has characteristics of both tropical and extratropical cyclones. This system is typically an upper-level cold low with circulation extending to the surface layer and maximum sustained winds generally occurring at a radius of about 100 miles or more from the center. In comparison to tropical cyclones, such systems have a relatively broad zone of maximum winds that is located farther from the center, and typically have a less symmetric wind field and distribution of convection.

SUBTROPICAL DEPRESSION: A subtropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) is 33 kt (38 mph or 62 km/hr) or less.

SUBTROPICAL STORM: A subtropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) is 34 kt (39 mph or 63 km/hr) or more.

SYNOPTIC TRACK: Weather reconnaissance mission flown to provide vital meteorological information in data sparse ocean areas as a supplement to existing surface, radar, and satellite data. Synoptic flights better define the upper atmosphere and aid in the prediction of tropical cyclone development and movement.

TROPICAL CYCLONE: A warm-core non-frontal synoptic-scale cyclone, originating over tropical or subtropical waters, with organized deep convection and a closed surface wind circulation about a well-defined center. Once formed, a tropical cyclone is maintained by the extraction of heat energy from the ocean at high temperature and heat export at the low temperatures of the upper troposphere. In this they differ from extratropical cyclones, which derive their energy from horizontal temperature contrasts in the atmosphere (baroclinic effects).

TROPICAL CYCLONE PLAN OF THE DAY: A coordinated mission plan that tasks operational weather reconnaissance requirements during the next 1100 to 1100 UTC day or as required, describes reconnaissance flights committed to satisfy both operational and research requirements, and identifies possible reconnaissance requirements for the succeeding 24-hour period.

TROPICAL DEPRESSION: A tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) is 33 kt (38 mph or 62 km/hr) or less.

TROPICAL DISTURBANCE: A discrete tropical weather system of apparently organized convection -- generally 100 to 300 nmi in diameter -- originating in the tropics or subtropics,

having a nonfrontal migratory character, and maintaining its identity for 24 hours or more. It may or may not be associated with a detectable perturbation of the wind field.

TROPICAL STORM: A tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) ranges from 34 kt (39 mph or 63 km/hr) to 63 kt (73 mph or 118 km/hr).

TROPICAL STORM WARNING: An announcement that tropical storm conditions (sustained winds of 39 to 73 mph) are *expected* somewhere within the specified coastal area within 36 hours.

TROPICAL STORM WATCH: An announcement that tropical storm conditions (sustained winds of 39 to 73 mph) are *possible* within the specified coastal area within 48 hours.

TROPICAL WAVE: A trough or cyclonic curvature maximum in the trade-wind easterlies. The wave may reach maximum amplitude in the lower middle troposphere.

O. Flood Myths

1. I have lived in my house for 50 years and I have never flooded or I have experienced flooding this year, so I should be good for another 99 years.

Unfortunately, that is not the case. FEMA renamed the 100 year flood to the 1% annual chance flood because the name led to confusion. If you live within a Special Flood Hazard Zone or otherwise known as the 100year or 1% annual chance floodplain, you have a 1% (or greater) chance of flooding every year. While that does not seem like a large risk, over the life of a 30 year mortgage, it can add up to a 26% chance of flooding.

2. Home owners insurance covers flooding.

While private flood insurance policies are available through select companies, most home owners' policies do not cover flooding. A separate flood insurance policy is required. Check with your insurance agent to discuss coverage.

3. I do not live in a floodplain so flood insurance is not available.

As long as your community participates in the National Flood Insurance Program, flood insurance is available regardless of what zone your house falls within on the FIRM. Even if your house falls within a lower risk zone (0.2 % annual chance flood or Zone X), you may still be at risk for flooding. FIRMs do not map every flood scenario. It is very possible to experience flooding greater than what is shown on the map. 25% of flood insurance claims fall outside of the mapped 1% annual chance floodplain.

4. I do not own my house so I cannot get flood insurance.

Flood Insurance is available to renters and covers the contents within the structure.

5. My house is elevated so I do not need to evacuate.

Please listen to your city officials. If they issue an evacuation order for your area, please heed the warning. Structures are elevated to reduce flood damage to the property. It does not ensure life safety. Evacuation orders are to promote life safety. Your house may not be damaged during a flood event, but if you experience a medical emergency or have a fire, emergency personnel may not be able to respond if the roads are flooded or conditions are unsafe.

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