A PATH TO RESILIENCE

Rye, NH

Image: Tammy Plawecki

Image: Bob McGrath


Image: Jim Hohenedel

INTRODUCTION

The Town has engaged in a number of resilience-building projects over the last 10 years. Rye's path to resilience began with a workshop series on preparing for climate change and a vulnerability assessment of sea level rise and storm surge in 2013. These efforts were led by the Rockingham Planning Commission, University of New Hampshire Cooperative Extension, NH Sea Grant, and a local committee. Since then, the Town has offered educational opportunities, created a Coastal Risks & Climate Adaption Master Plan chapter, updated regulations, and implemented a number of other projects.

This story highlights examples of the actions and efforts the Town has taken to increase resilience to flooding, storm surge, sea level rise, and other climate change impacts.

This NH Coastal Adaptation Workgroup project was made possible with support from the National League of Cities' 2021 Leadership in Community Grant, the Piscataqua Region Estuaries Partnership, and the Great Bay Stewards. This book was created by EF | Design & Planning, LLC with support from Kimberly Reed, Planning and Zoning Administrator, Town of Rye, NH in February 2022.

2012

PREPARING FOR CLIMATE CHANGE PROGRAM

2013

2014

CLIMATE CHANGE PRESENTATION AT THE RYE LIBRARY

2015

TIDES TO STORMS VULNERABILITY ASSESSMENT

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2012-2014

PREPARING FOR CLIMATE CHANGE PROGRAM

WORKSHOP 1

WORKSHOP 2

WORKSHOP 3

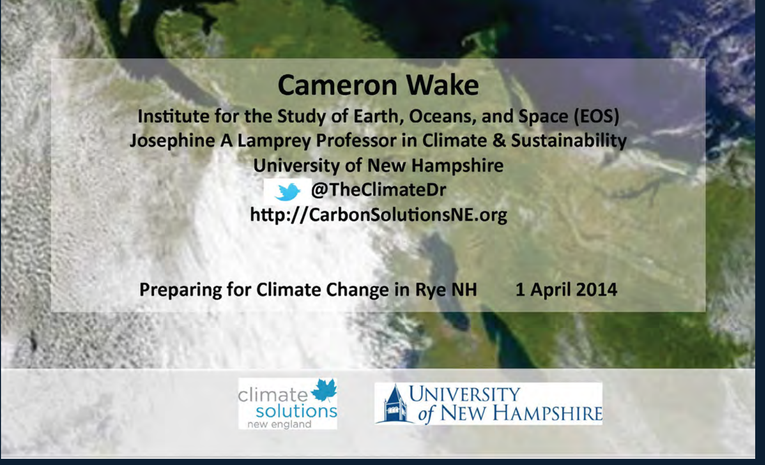
Image: Sea Bee Honey

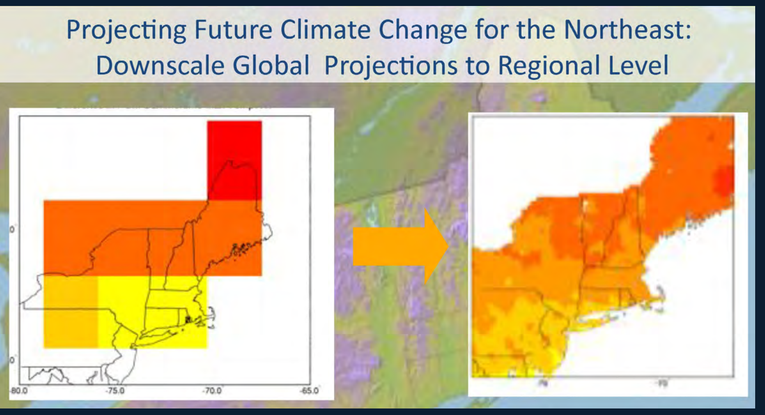
In 2012-2014, project staff and a local steering committee organized a workshop series called the Preparing for Climate Change Program. This program included three workshops and a field trip designed to provide information and tools to better understand how climate change — including sea level rise, storm surge, more intense and more frequent storms, hotter summers and warmer winters — might affect Rye and its residents, businesses, and visitors. The project was funded by the NH Coastal Program. The goals of the project were to:

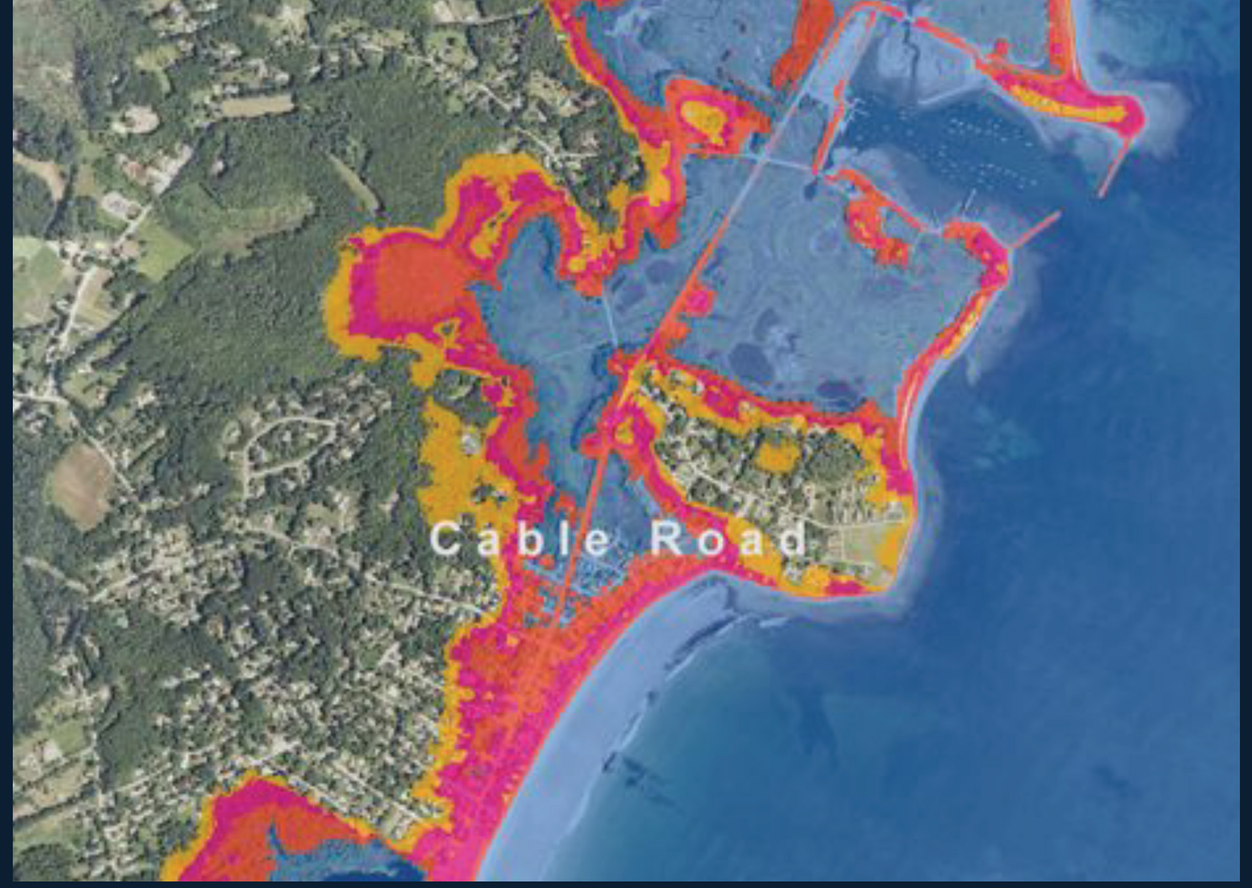
- CONDUCT WORKSHOPS TO FACILITATE DISCUSSION AND RAISE AWARENESS ABOUT CLIMATE CHANGE, INCLUDING THE SCIENCE AND LOCAL IMPACTS OF CLIMATE CHANGE
- ATTEND A WALKING TOUR TO UNDERSTAND HOW SALT MARSHES ARE AFFECTED BY SEA LEVEL RISE AND HOW THEY CONTRIBUTE TO RESILIENCY
- IDENTIFY PRIORITY ISSUES AND/OR ACTIONS THE TOWN MAY WANT TO CONSIDER TO ADDRESS IMPACTS
- BEGIN A DISCUSSION ABOUT HOW THE COMMUNITY AND EXISTING MUNICIPAL FUNCTIONS, PLANS, POLICIES AND REGULATIONS MAY BE MODIFIED TO ADDRESS ANTICIPATED IMPACTS FROM CLIMATE CHANGE.

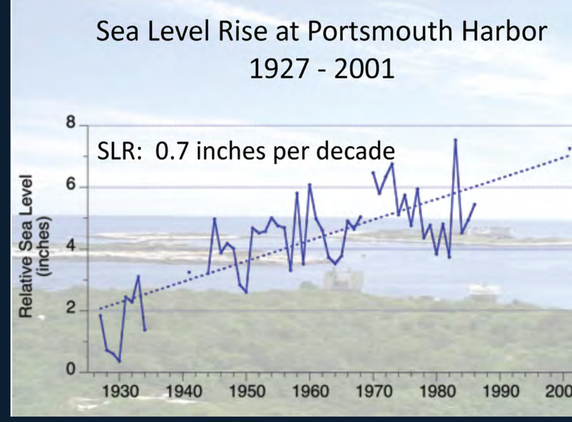
During the project, the community generated a list of prioritized concerns and began a dialogue about possible action items to adapt to climate change. Freshwater resources and impacts to salt marshes were the top priorities in 2014 workshop.

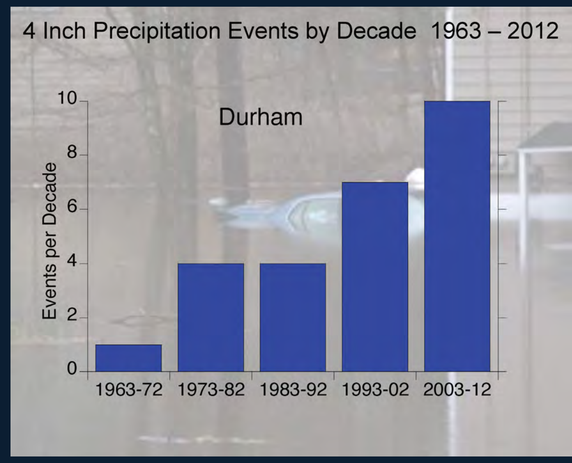
LEARN MORE











2014

CLIMATE CHANGE PRESENTATION AT THE RYE LIBRARY

The Town hosted a presentation on climate change and sea level rise by climatologist Dr. Cameron Wake. The presentation provided an overview of climate science, including data available on https://www.climate.gov/. Several resources were explained, including Climate Change in the Piscataqua/Great Bay Region: Past, Present, and Future. Dr. Wake also presented to the town in 2011.

PRESENTATION SLIDES

Image: Steve Miller

2015

TIDES TO STORMS VULNERABILITY ASSESSMENT


Image: Lisa Wise


Image: Kim Reed

The Town worked with the Rockingham Planning Commission on the Tides to Storms project. Tides to Storms is a comprehensive vulnerability assessment that identifies and measures impacts of flooding from sea level rise and storm surge on built structures, human populations, and natural environments. The assessment is intended to assist Rye to take action to prepare for increased flood risk.

Maps and statistical data about the potential impacts of six sea-level rise and storm surge scenarios on infrastructure, critical facilities, transportation systems, and natural resources were produced.

Multiple regulatory, planning and policy, and community outreach and engagement recommendations were developed based on the findings. The assessment and recommendations continue to inform the Town.

EXAMPLES OF RECOMMENDATIONS

Elevate Structures 2 feet Above Base Flood Elevation. Adopt standards in floodplain zoning and/or Site Plan Review and Subdivision Regulations that require all new development and redevelopment to be elevated 2 feet above the base flood elevation. Two feet of additional elevation will ensure that structures are protected from flooding based on the highest sea-level rise projection of 2 feet by 2050.

Implement FEMA's High Water Mark Initiative. Communities implement the High Water Mark Initiative by providing information on past floods, such as documenting high water marks in public places, and posting maps and photographs of past floods on their websites.

FEMA Community Rating System. Support implementation of climate adaptation actions that will qualify the town for FEMA's Community Rating System (CRS) program or increase its rating in the CRS program. Climate adaptation implementation includes planning and policy, regulatory, non-regulatory, and community outreach and engagement activities.

FULL REPORT

REGIONAL VULNERABILITY MAP SET

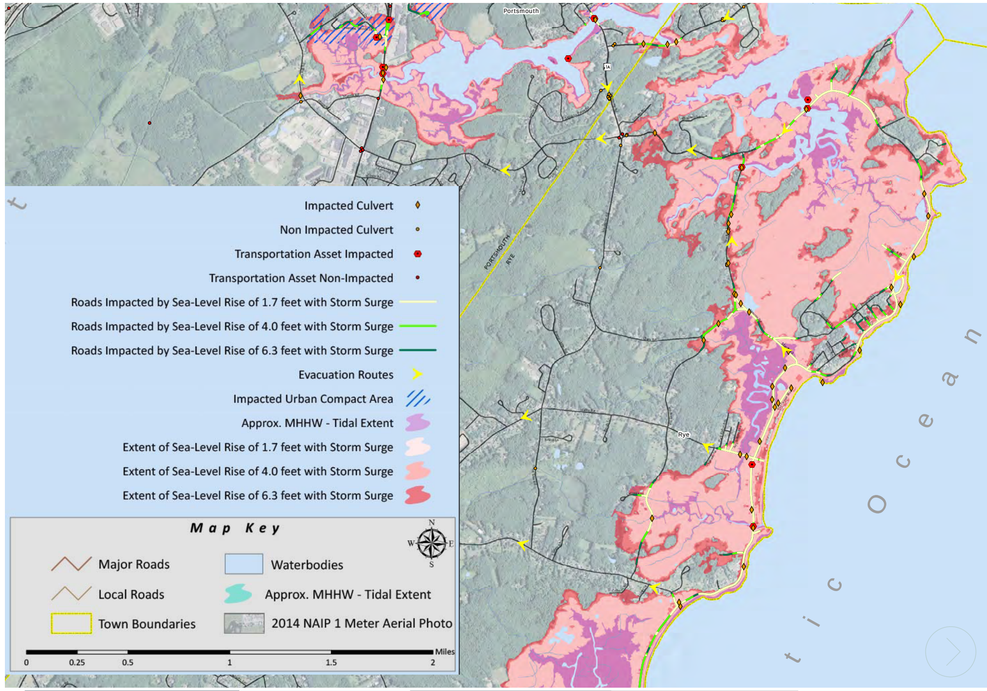


Image: Kim Reed

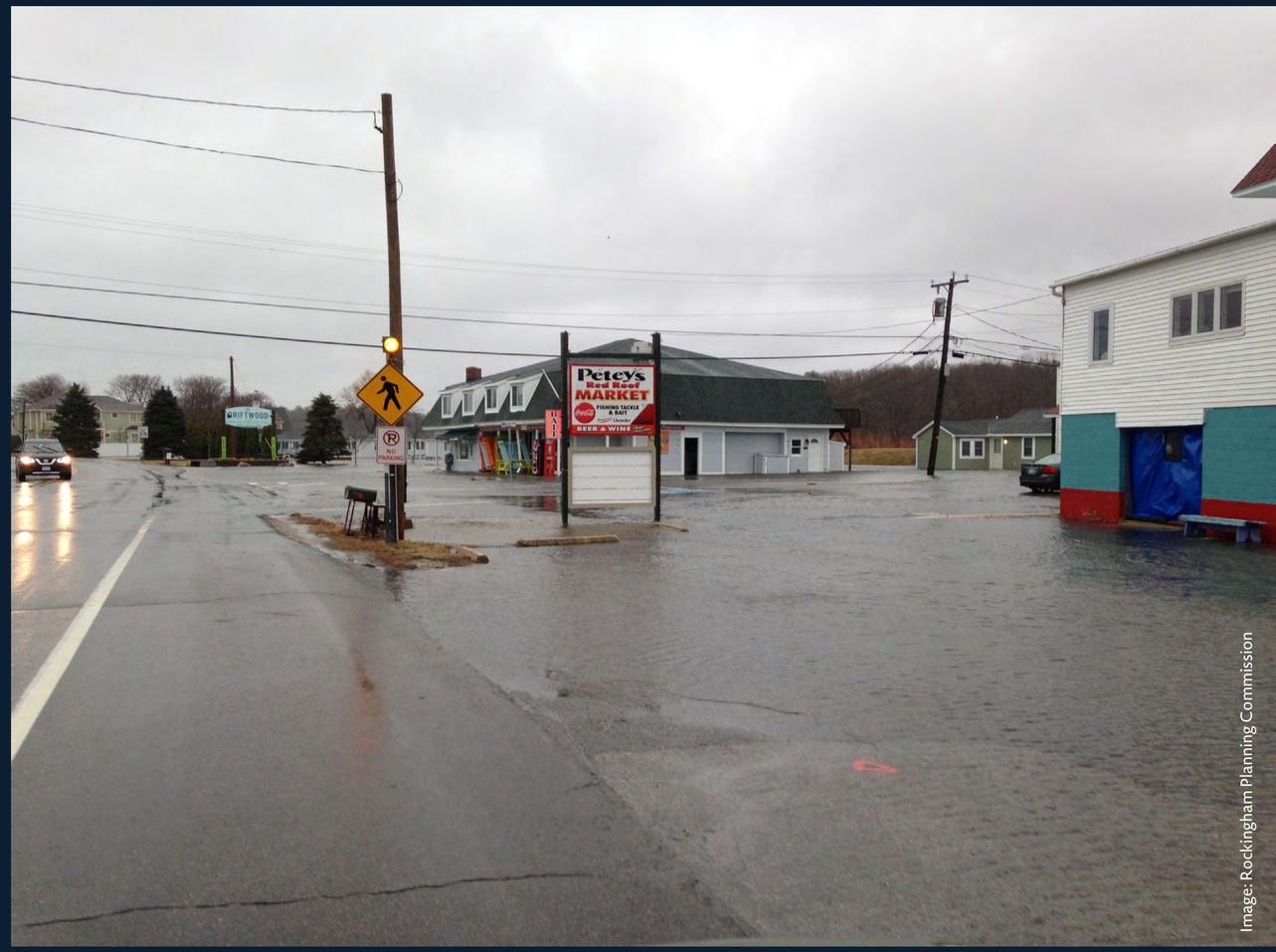


Image: Rockingham Planning Commission

2015-2016

COMMUNITY RATING SYSTEM

In 2015, Rye received funding through the Piscataqua Region Environmental Planning Assessment (PREPA) grant program to prepare an application to the Federal Emergency Management Agency (FEMA)'s National Flood Insurance Program (NFIP)'s Community Rating System (CRS). CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements.

As a result of participation in the program, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions that meet the three goals of the CRS:

1. REDUCE FLOOD DAMAGE TO INSURABLE PROPERTY
2. STRENGTHEN AND SUPPORT THE INSURANCE ASPECTS OF THE NFIP
3. ENCOURAGE A COMPREHENSIVE APPROACH TO FLOODPLAIN MANAGEMENT.

Participation in CRS would institutionalize the Town's commitment to better floodplain management, which is a critical focus of the community as sea levels continue to rise and coastal storms intensify. Participation in the CRS would also create strong incentives among town residents to improve buffer protection and management, which are both key action items identified for the Rye in the PREPA.

In 2021, Rye had a community assistance visit and is in the process of working to address non-compliant properties in order to join the program in the fall of 2022.

LEARN MORE

Image: Rick Clinche

Image: Lucas Olen

2015-2017

COASTAL RISKS & CLIMATE ADAPTATION CHAPTER

One of the recommendations from the Tides to Storms Vulnerability Assessment was to adopt a Coastal Hazards Chapter in the Town's Master Plan that incorporates information and recommendations from the Tides to Storms Vulnerability Assessment Report for Rye. In 2015, the Tides to Storms 2 Project implemented this recommendation.

The Town of Rye applied for grant funds to support preparation of a new Master Plan Chapter to address growing concerns in the community about the potential future impacts of climate change. In September 2016, the Planning Board agreed to make revisions to complete the final draft of the Coastal Risks and Climate Adaptation Chapter and move the Chapter to a public hearing for adoption in 2017 as part of their ongoing Master Plan update project.

The Coastal Hazards and Adaptation Chapter addresses:

- PRESENT AND FUTURE COASTAL HAZARDS
- FUTURE IMPACTS TO COASTAL AREAS
- OTHER CLIMATE-RELATED IMPACTS
- FUTURE GROWTH AND DEVELOPMENT
- COMMUNITY ADAPTATION AND RESILIENCE
- RECOMMENDATIONS FOR FUTURE ACTIONS

GO TO CHAPTER

Image: Bob McGrath

EXCERPT FROM THE CHAPTER

Like other coastal municipalities in New Hampshire, Rye is confronted by a challenging set of concerns related to coastal hazards and climate change that include exposure to storms, coastal erosion and flooding, damage to critical infrastructure, and impacts to key coastal resources. Rye has experienced significant impacts during extreme and moderate coastal storm events, increases in extreme rainfall events, and localized flooding from more frequent seasonal highest tides both in immediate coastal areas and inland. Coastal flooding is compounded by increased stormwater runoff from development and impervious surfaces throughout the Town. These observed impacts may be exacerbated by changes in climate that may cause future increases in the frequency and intensity of storms and rate of sea-level rise.

Projected changes in climate and coastal conditions will present challenges to many sectors of municipal governance, asset and infrastructure management, sustainability of recreation and tourism, and protection of natural resources and coastal ecosystems. Adapting to changing conditions will play an important part in the Town's strategic planning and actions in the future. Effective preparedness and proactive land use management will help the Town reduce its future exposure and improve resilience to increased flood risks and thus minimize economic, social, and environmental impacts.

2016-2018

3 MASTER PLAN CHAPTERS INCORPORATE CLIMATE RESILIENCE

Coastal hazards and adaptation strategies identified in the Coastal Risks and Climate Adaptation Chapter were expanded upon in the Existing & Future Land Use, Transportation, and Natural Resources Chapter of the Master Plan from 2016-2017 and adopted in 2018.

CH. 4 EXISTING & FUTURE LAND USE

The Existing and Future Land Use Chapter includes a section on Climate Change and Adaptation that references information from the NH Coastal Risks and Hazards Commission Report and describes the terms adaptation and resilience. Recommendations such as Incorporate coastal hazards, risks and vulnerability in policies, plans and investments and Support land development regulations that reduce vulnerability and protect benefits that natural ecosystems provide are included in the Chapter.

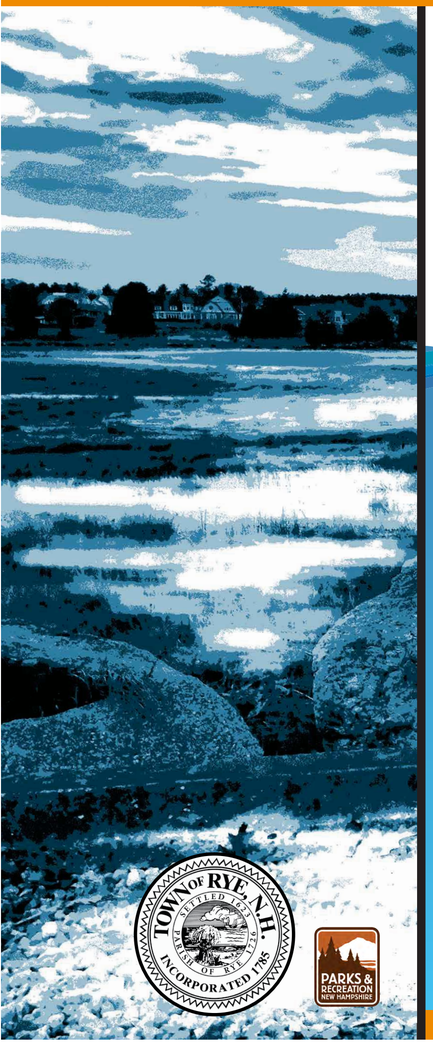
CH. 6 TRANSPORTATION

The Transportation Chapter includes a Climate Change and Adaptation section that carries forward information from the Tides to Storms Vulnerability Assessment. One finding is that Long term infrastructure management, incorporating a staged and iterative approach, would benefit from an analysis of the costs necessary to improve roads and drainage infrastructure to withstand projected sea-level rise elevations in 2050 and 2100. The Chapter also includes recommendations for climate adaptation from the Tides to Storms report (2015) and NH Coastal Risks and Hazards Commission Report (2016).

CH 7. NATURAL RESOURCES

The Natural Chapter includes a section on Coastal Hazards and Climate Change and a set of recommendations for climate adaptation actions from the 2015 Master Plan Public Input Session, NH Coastal Risks and Hazards Commission Report (2016), and Tides to Storms Vulnerability Assessment (2015).

ISSUES IDENTIFIED IN CLIMATE SESSIONS



TIDES & STORM SURGES

Today's flood could be tomorrow's high tide!

Know Your Line... Be Flood Aware

Why do we care about coastal flooding at Odiorne Point State Park?

Here at the Odiorne Point State Park, the parking lot, boat launch and boardwalk are sometimes flooded by nuisance high tides and large storms like the nor'easters of 2018. Rising sea levels will increase the severity of coastal storm-related flooding which would impact access to this facility, local and state roads, and other nearby recreational areas.

How has sea level changed over time?

Lands that border the Atlantic Ocean and inland tidal areas experience frequent nuisance flooding from seasonal high tides. Between 1927 and 2001, sea level in coastal New Hampshire increased by approximately 5.3 inches creating a noticeable difference in high water flooding. The type of nuisance flooding we experience today will become more frequent and more severe as sea-level rise accelerates over time.

How high will the water reach?

The FLOOD marker shows the flood elevation from a 100-year storm event (which has a 1% chance of occurring in any given year). How high would the water be if sea-level increased by 2 feet, 4 feet or over 6 feet? The SLR markers show future sea-level rise projections above mean high water by the year 2100, +6.6 feet being on the higher end of what we might see in this location.

This project was funded, in part, by NOAA's Office for Coastal Management under the Coastal Zone Management Act in conjunction with the NH Department of Environmental Services Coastal Program. Sign Design by CPorter Designs, Photo by Julie LaBranche.

What can you do to spread the word about flooding? Take a photo with this High Water Mark sign and post it to social media using the hashtag #highwatermarknh

Image: Rockingham Planning Commission, modified

MARKERS WERE INSTALLED AT THE ODIORNE STATE PARK BOAT LAUNCH (ABOVE) AND ON WALLIS ROAD NEAR THE CORNER OF ROUTE 1A (RIGHT).

Image: Rockingham Planning Commission

2018

HIGH WATER MARK INITIATIVE

As part of the High Water Mark Initiative project, signs with markers showing elevations of future projected sea levels and information about local coastal flooding impacts were installed in the community. The project was conducted by the Rockingham Planning Commission in coordination with the Town through a grant from the NHDES Coastal Program.

The project involved:

- INSTALLING A SIGN/MARKER IN A HIGHLY VISIBLE LOCATION, ACCESSIBLE TO THE PUBLIC, THAT SHOWS THE ELEVATION OF PAST FLOOD EVENTS AND FUTURE PROJECTED SEA-LEVEL RISE
- IDENTIFYING CLIMATE CHANGE "MITIGATION" ACTIONS THE MUNICIPALITY CAN IMPLEMENT

LEARN MORE

Image: Bob McGrath

2019

WATER RESOURCE PROTECTION & FLOOD STORAGE WORKSHOP

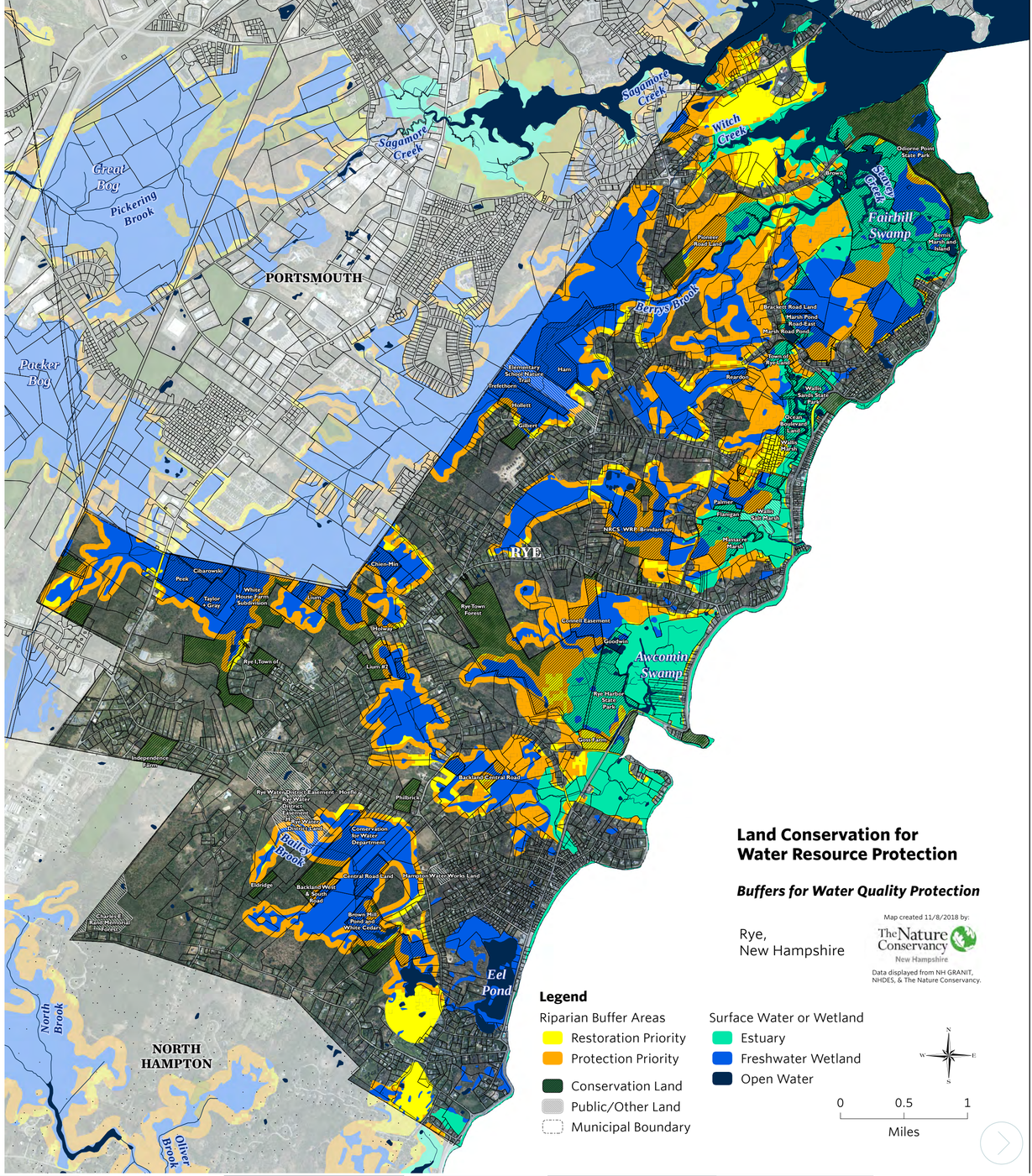
The Conservation Commission hosted a workshop that focused on the value of salt marshes and flood storage areas and the importance of clean public drinking water supplies.

Maps produced by The Nature Conservancy were reviewed. The maps built on an update to the Land Conservation Plan for New Hampshire's Coastal Watersheds (2006). This project identified land protection priorities on a watershed scale. This project provided new data showing land protection priorities that would mitigate flood risk, reduce pollution, and improve the protection of drinking water supplies for planners, municipal staff, volunteer board members, land trusts, agency staff, and others. The maps identify lands that, if protected, will:

- BENEFIT WATER QUALITY IN THE COASTAL WATERSHED
- ATTENUATE FLOOD FLOWS AND MITIGATE FLOOD RISKS
- SECURE PUBLIC DRINKING WATER SUPPLIES.

This project implemented a recommendation from the Coastal Risk and Hazards Commission Report: Protect land that allows coastal habitats and populations to adapt to changing conditions and also provides ecosystem services that protect people, structures, and facilities.

EXPLORE THE DATA



2020

COMPREHENSIVE RE-WRITE OF REGULATIONS

In 2020, Rye undertook a comprehensive update of its land development regulations, as recommended by the Town's Coastal Hazards and Adaptation Master Plan Chapter. The project, which was funded by the Town, was led by the Long Range Planning Committee and Planning Board with assistance from the Rockingham Planning Commission.

Rye's Planning board was experienced with applying Tides to Storms data when reviewing a subdivision application in a high-risk flood area. This project codified this in the regulations.

The overall purpose was to minimize and prevent impacts from coastal and freshwater flooding. Goals included:

- IDENTIFY AND EVALUATE FLOOD IMPACTS AND VULNERABILITIES
- INCORPORATE FLOOD HAZARDS IN SITE DEVELOPMENT PLANS
- PROTECT PUBLIC AND PRIVATE PROPERTY, INFRASTRUCTURE AND NATURAL RESOURCES
- REDUCE OR MINIMIZE IMPACTS OF FLOODING FROM STORMWATER
- MAINTAIN NATURAL SHORELINE PROCESSES AND BENEFITS
- CREATE RESILIENCE IN ECONOMY, RESIDENTIAL AREAS, COASTAL BUSINESSES AND INDUSTRIES, TOURISM, RECREATION.

The following amendments were made to Land Development Regulations Section 202-6.9-Coastal Hazard Standards for Site Plan Review and Subdivisions:

- REFERENCE TIDES TO STORMS VULNERABILITY ASSESSMENT, MAPS AND SEA-LEVEL RISE (SLR) PROJECTIONS
- SHOW PROJECTED FLOOD EXTENTS USING WATER ELEVATIONS FOR SLR AND THE NH COASTAL FLOOD RISK SUMMARY
- NEW SEPTIC SYSTEMS SHALL BE LOCATED OUTSIDE OF HIGH-RISK FLOOD AREAS
- ROADS CONSTRUCTED 2 FEET ABOVE MEAN HIGH WATER TABLE
- SHORELAND BUFFERS EXPANDED WHEN NECESSARY TO INCLUDE FULL EXTENT OF 2 FEET SLR SCENARIO AT 2050.

BASED ON THE MASTER PLAN, THE TOWN COMPLETED COMPREHENSIVE REWRITE OF OUR LAND DEVELOPMENT REGULATIONS AND NOW USES THE SCIENCE ON ANY PROJECTS IN THE COASTAL FLOOD HAZARD ZONE.

-Kimberly Reed, CFM,
Planning & Zoning Administrator

Image: Kim Reed

LEARN MORE

Image: Kim Reed

Image: Kim Reed


Image: Kim Reed


Image: Kim Reed

2021-2022

MULTI-HAZARD MITIGATION PLAN


Image: Kim Reed

The Town contracted Rockingham Planning Commission (RPC) to complete the 2022 update of the Hazard Mitigation Plan. Local hazard mitigation plans are updated every five years. They provide the opportunity identify and rank hazards and to identify appropriate mitigation strategies to reduce the risk of loss of life and damage to property. These plans are a requirement for several sources of federal grant funds such as the Building Resilient Infrastructure and Communities and Pre-Disaster Mitigation Programs. Rye's Emergency Management Team and RPC are scheduled to present the plan to the Selectmen and public in March 2022.

LEARN MORE

2021 - 2022

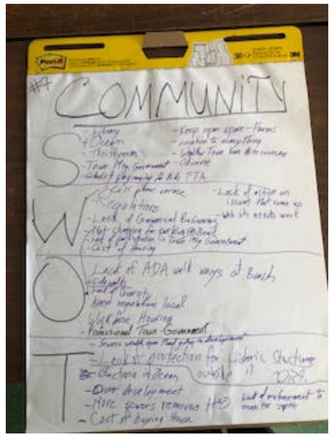
MASTER PLAN VISIONING

WHAT IS A MASTER PLAN?

In 2021 the Town initiated a visioning process to inform the Master Plan development. The Town sought input on concerns about living and working in Rye in the next 5-10 years.

Nearly 200 people responded to the Town's Master Plan community survey. Participants provided input on a variety of concerns, many of which are related to resiliency:

- COASTAL DEVELOPMENT
- CLIMATE CHANGE
- FLOODING, FLOODING OF MARSHES
- ENVIRONMENT
- WATER QUALITY, HEALTHY DRINKING AND OCEAN WATER
- SEA LEVEL RISE
- CLIMATE CHANGE IMPACTS LIKE EXTREME RAIN AND SNOW EVENTS, RISING SEAS, DROUGHT
- BEACH EROSION
- DEVELOPMENT IN WETLANDS



This input will help inform the development of the Master Plan and the Vision Chapter of the Master Plan. The visioning process was led by Planning Consultant Julie LaBranche.

SURVEY Q&A:
WHEN YOU THINK OF RYE 5-10 YEARS FROM NOW, WHAT WOULD YOU LIKE TO SEE?

Image: Kim Reed


Image: Kim Reed

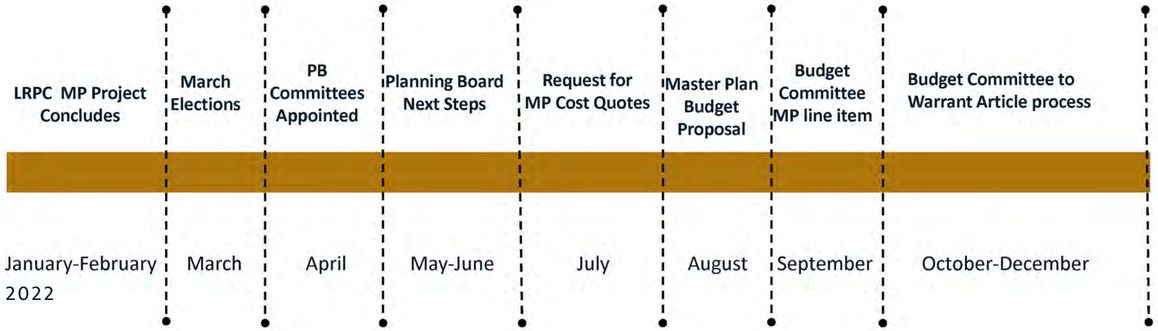

Image: Kim Reed


Image: Kim Reed

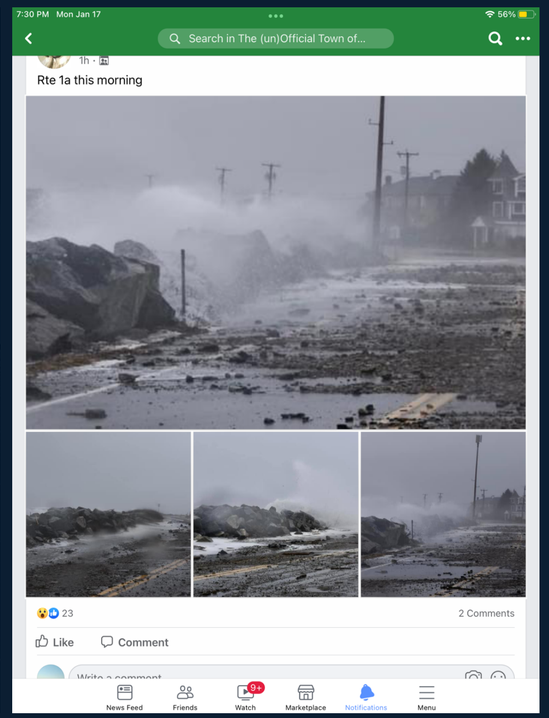

Image: Kim Reed

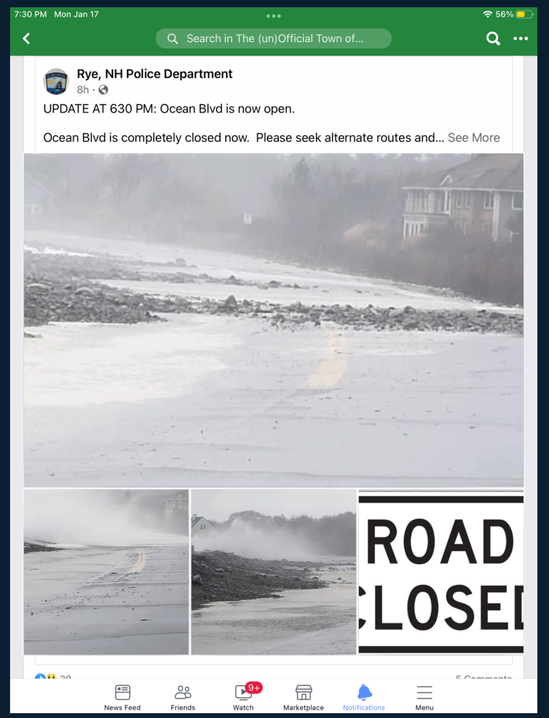
MASTER PLAN 2023-2034 NEXT STEPS

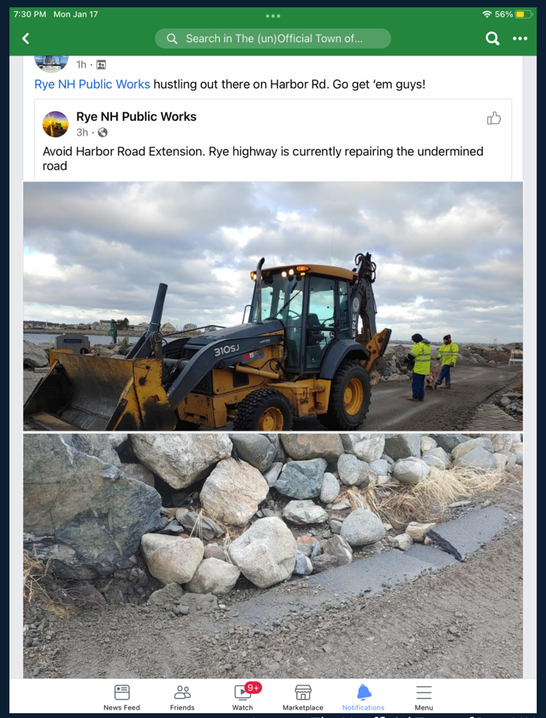
The Planning Department aims to propose a Warrant Article in 2023 for funding for a comprehensive Master Plan update. The 2021 visioning sessions provided the Town with a better understanding of key topics to explore in the Master Plan, as well as feedback about the type of plan that the community seeks. A key objective of the Master Plan update is to weave in climate change and the diverse impacts of climate change. Next steps for the Master Plan update process were presented to the Planning Board on February 8, 2022. The timeline below summarizes the proposed process and schedule.



Credit: Julie LaBranche







Images: The Unofficial Town of Rye, NH

2022

On January 17, 2022, storm conditions and an extreme high tide compromised roads in Rye. A portion of Harbor Road and Ocean Road/Rt 1A were compromised. The Town of Rye, along with the Town of North Hampton and NH Department of Transportation detoured all motor vehicle, bicycle, and pedestrian traffic on Ocean Blvd Route 1A at the Rye-North Hampton Town line due to the potential for collapse. Harbor Road collapsed in the storm and required emergency repair.

Image: Jonathan Leonard