

TIDES, TAXES, & NEW TACTICS

PLANNING FOR ADAPTATION AND IMPACTS OF SEA LEVEL RISE AND STORM SURGE THROUGH GIS-DRIVEN VULNERABILITY ASSESSMENTS AND COMMUNITY DIALOGUES

Municipal Virtual Workshop

Town of Wells

Wednesday, March 31, 2021

6:00 – 7:00 pm



This presentation was prepared by SMPDC under award CZM NAI8NOS4097419 to the Maine Coastal Program from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of SMPDC and do not necessarily reflect the views of NOAA or the Department of Commerce.

Workshop summary

25 participants included project team, town staff (Manager, Assistant Clerk, Assessor, Planner/Engineer, Code Enforcement Officer,); board members (Board of Selectmen, Board of Assessment, Zoning Board of Appeals, Planning Board, Budget Committee); committee members (Hospitality Committee, Wells Energy Advisory Committee, Comprehensive Plan Update Committee) and community members.

Purpose of the meeting, to provide an opportunity for participants to:

- Learn about the findings of the sea level rise vulnerability assessment and economic analysis of the Tides, Taxes, and New Tactics grant project. Ask questions about the findings from the vulnerability assessment and economic analysis of sea level rise in Kennebunk (and southern Maine).
- Review possible local strategies for protecting people, property, and natural resources from coastal flooding and provide feedback on incorporating strategies into town planning.
- Share strategies to engage community members in the conversation.

This event is part of the Tides, Taxes, & New Tactics Project: Planning for Sea Level Rise and Coastal Adaptation in Southern Maine, led by Southern Maine Planning and Development Commission and funded by the Maine Coastal Communities Grant Program.

Team Members:

Abbie Sherwin, Southern Maine Regional Planning and Development Commission (Lead)
Rachel Bouvier and Joie Grandbois, rbouvier consulting (Environmental Economists)
Alex Grey, GEI Consultants (Water Resources Scientist)
Annie Cox and Jessica Brunacini, Wells Reserve; and Kristen Grant, Maine Sea Grant (Community Engagement Specialists)

About This Workshop Summary Document

This document includes all the information presented during the community zoom webinar. It contains questions & answers alongside slides when it makes sense, otherwise they are found during the Q&A section. *Team Notes* are answers and thoughts put together after the workshop as not all questions were able to be answered during the live event. Participant Comments provided via the chat function or during the community engagement exercise are included. Light editing was done to participant comments, questions, and answers for clarity. Blue text denotes hyperlinks to resources.

WORKSHOP AGENDA

- I. Welcome & introduction
- II. Project overview
- III. Sea level rise assessment
 - GIS vulnerability assessment: overview & results
 - Socio-economic analysis: overview & results
- IV. Discussion, Q&A
- V. Flood resilience strategies
- VI. Community engagement



PROJECT PARTNERS



Summary Notes

Welcome & thank you

- A special thanks to Larissa Crockett and Mike Livingston for their active participation and assistance with the project. I would also like to extend a sincere thank you to former town manager Jon Carter, who was involved in this project prior to his retirement.

PROJECT OVERVIEW: TIDES, TAXES, & NEW TACTICS

- Funded by Maine Coastal Program's **Coastal Community Grant Program (CCG)**
 - **\$56,675**
 - \$46,187 (grant)
 - \$10,470 (supplemental state funding)
 - *Match: \$27,140 (cash and in-kind)*
 - Towns of Kennebunk, Wells, and York
 - Assess vulnerability to coastal flood hazards
 - Develop locally-tailored adaptation strategies

Summary Notes

Project Overview

- This project, funded by the Maine Coastal Program's Coastal Community Grant Program and led by SMPDC, is working to assess local vulnerabilities to coastal flood hazards and develop strategies and recommendations to reduce flood risk and enhance resilience in the towns of Kennebunk, Wells, and York.
- The project aims to provide the towns with information about impacts to the built environment, as well as economic and social impacts of coastal flooding, in order to enhance understanding of local risk and inform action to protect people, property, the economy, and natural resources.
- The findings provide an overview of potential impacts and can serve as the foundation for further study and more detailed assessment and analysis. In other words, this project can be seen as a first step toward understanding York's vulnerability to sea level rise and guide additional assessment and planning.

PROJECT GOAL

Engage and provide the towns with locally specific information about economic and social vulnerabilities associated with sea level rise and coastal flood events in order to develop strategic, effective, locally relevant adaptation and resiliency planning strategies and policies that address those vulnerabilities and are tailored to town conditions, needs, and interests.

PROJECT OVERVIEW



Summary Notes

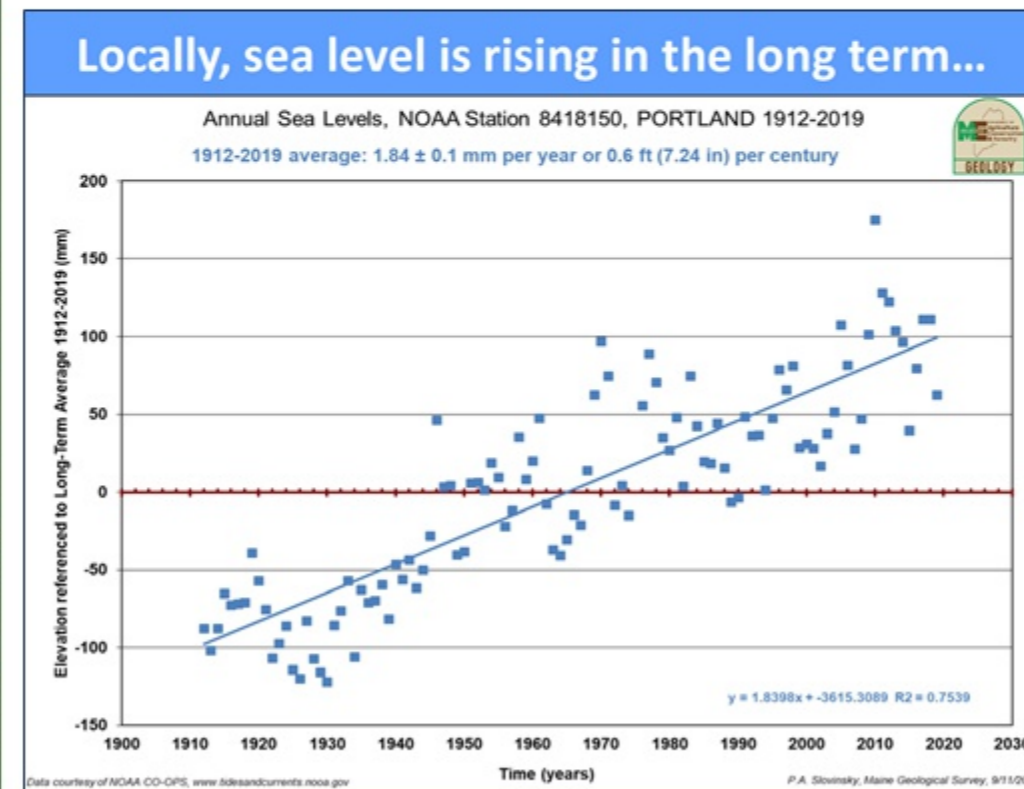
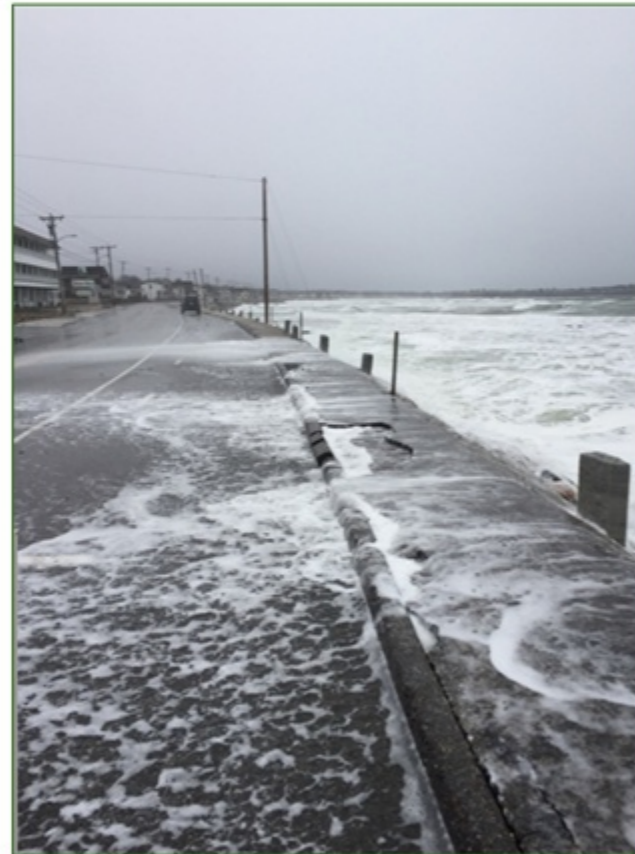
Overview of key components and timeline

• To accomplish that goal, the project, which began in November 2019 and is slated to conclude this coming June, has 6 primary components. The first was the establishment of a project advisory committee, made up of municipal staff from each of the three towns to guide the project and ensure the methodology, findings, and recommendations are tailored to and suit the needs of the towns. Next were the impact assessments, which are separated into the GIS-based vulnerability assessment completed by GEI Consultants, and the socio-economic analysis completed by rbouvier consulting. The results of those assessments are informing the development and identification of community resilience strategies to reduce flood risk, which is being led by SMPDC. Project information is being shared through community engagement efforts, such as this workshop, and will be compiled and published in the form of a regional plan that summarizes town-specific results and resilience strategies for consideration by the towns.

• It is worth mentioning that the community engagement workshops were originally meant to be held in-person so people could interact with the assessment maps and have group discussions, but we had to adjust our approach due to COVID, so we thank you for being flexible as we try to present this rich information through the confines of a computer screen.

COASTAL FLOODING: HISTORICAL TRENDS

- Sea levels have historically been rising and in recent decades, the rate of rise has accelerated to about **1 ft per century**, or **3 to 4 mm per year** in Maine.
- Roughly half of the rise we have seen over the past century has occurred since 1990.
- Nuisance flooding in southern Maine in the last decade occurred about **4 times more frequently** than the 100-year average.



Summary Notes

Coastal flooding historical trends

- One of the primary reasons for pursuing this project is that coastal flooding poses significant threats to southern Maine communities. Many of the characteristics that make towns like Wells so desirable also make them exceptionally vulnerable to coastal storms and rising seas. Wells' coastal development provides a substantial portion of the town's tax base, generating vital funds that sustain community operations, services, and programs. However, it is that same development that is most susceptible to coastal flooding. Additionally, coastal areas and resources that drive tourism and the local economy are also vulnerable to rising seas.
- Sea level in Maine, as shown in this graph, has been rising in the long-term. Over the past few decades, the rate of rise has accelerated to 3 to 4 millimeters per year. That rise is increasing the frequency of nuisance or high tide flooding, with southern Maine seeing 4 times as many nuisance flooding events over the last decade compared with the average of the past 100-years.

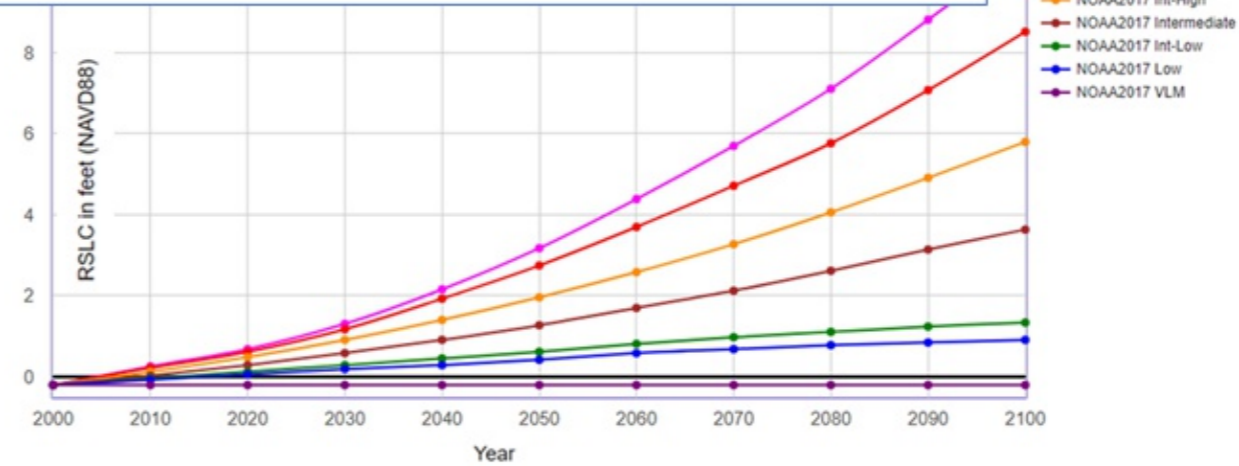
COASTAL FLOODING: FUTURE PROJECTIONS

SEA LEVEL RISE IN MAINE

- State Climate Action Plan:
 - 1.5 ft (3.0 ft) by 2050
 - 3.9 ft (8.8 ft) by 2100
- Sea level will likely continue to rise between 3 and 5 ft by the end of 2100, though higher scenarios are possible
- 1 ft of sea level rise will increase the frequency of nuisance flooding by 15-fold

Scenarios for PORTLAND
NOAA2017 VLM: 0.00000 feet/yr
All values are expressed in feet

Year	NOAA2017 VLM	NOAA2017 Low	NOAA2017 Int-Low	NOAA2017 Intermediate	NOAA2017 Int-High	NOAA2017 High	NOAA2017 Extreme
2000	0.10	0.10	0.10	0.10	0.10	0.10	0.10
2010	0.10	0.24	0.27	0.33	0.43	0.53	0.56
2020	0.10	0.37	0.43	0.60	0.79	0.93	0.99
2030	0.10	0.50	0.60	0.89	1.22	1.48	1.61
2040	0.10	0.60	0.76	1.22	1.71	2.24	2.47
2050	0.10	0.73	0.93	1.58	2.27	3.06	3.48
2060	0.10	0.89	1.12	2.01	2.89	4.01	4.70
2070	0.10	0.99	1.29	2.43	3.58	5.03	6.01
2080	0.10	1.09	1.42	2.93	4.37	6.08	7.42
2090	0.10	1.15	1.55	3.45	5.22	7.39	9.13
2100	0.10	1.22	1.65	3.94	6.11	8.83	10.90



- Project assessment scenarios: 1.6 ft, 3.9 ft, and 6.1 ft
- Source: Maine Geological Survey
 - Regionalized, specific to ME coast
 - Sea level rise and storm surge
 - Bathtub model - does NOT include wave action
 - Highest Astronomical Tide (HAT) as starting point

Summary Notes

Coastal flooding future projections

- That rise is projected to continue and accelerate into the future. We won't be going into detail about sea level rise projections in this presentation, but did want to provide some information for context.
 - The recently released State Climate Action Plan recommends that the State commit to manage 1.5 ft by 2050 and 3.9 ft by 2100 and prepare to manage 3.0 ft by 2050 and 8.8 ft by 2100, targets that were identified by state experts and scientists based on the best available scientific information.
 - The graph and associated table on the right side of the screen show the sea level rise projections for Maine, based on the long-term sea level rise data from Maine's tide gauges and sea level rise scenarios identified in the US National Climate Assessment.
 - The black arrows indicate the scenarios assessed for this project, which were 1.6 feet, 3.9 feet, and 6.1 feet of flooding, which were selected by the project advisory committee.
- The data for these scenarios were developed by the Maine Geological Survey and use the highest astronomical tide as the starting point to model various water levels representing sea level rise and/or storm surge along the Maine coastline.

- The boxes around certain scenarios show the full set of scenarios modeled by the Maine Geological Survey. You will notice that some of the values are similar for different timeframes and emission scenarios, so we can use that information to consider potential flooding under different time horizons and conditions.
- It is important to note that the modeled data do not account for wave action. The scenarios can represent sea level rise and/or storm surge. For sea level rise, the modeled scenarios show what the average still-water high tide would be. For reference, the October 2019 nor'easter that caused widespread power outages had a recorded storm surge of 3.9 feet in Portland. The Patriots' Day storm in April of 2007 had a recorded storm surge of 2.5 feet.
- While this project had started and the scenarios had already been selected well-before the state climate action plan was released, the plans' recommendations line up fairly well with the scenarios used for the project, which is helpful for aligning future municipal and regional planning action with state-level guidance, planning, and potential funding opportunities.

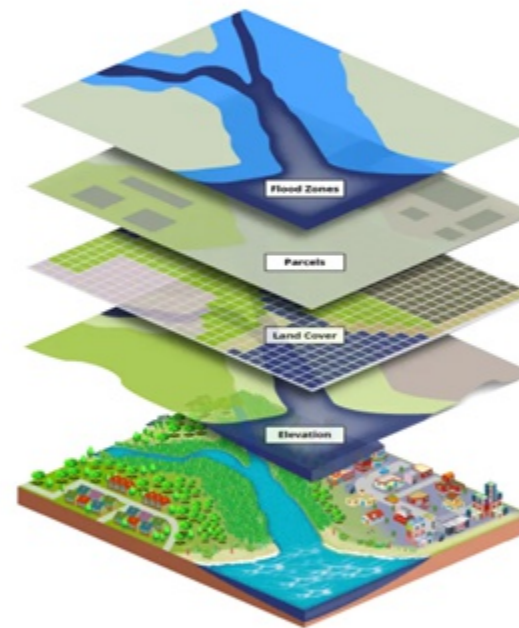
GIS VULNERABILITY ASSESSMENT

Inputs

- Sea level rise and storm surge projection
- Municipal geospatial and assessor's data
- Census data

Outputs

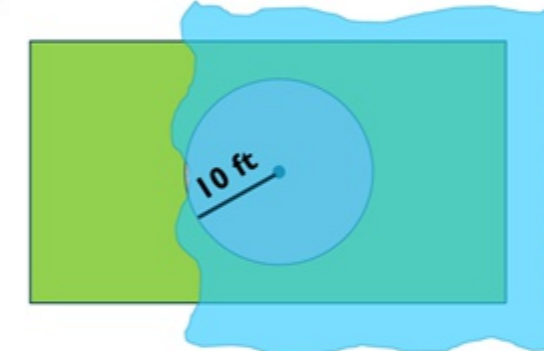
- Number of parcels impacted
 - Land & building vs. land only
 - Building footprints estimated
- Assessed value of impacted buildings and land
 - Residential, businesses, municipal
- Population and demographic information within impacted area
 - Census block group: people, households, median income, age
- Impacts by zoning district



“Impacted” means ‘touched’ by water

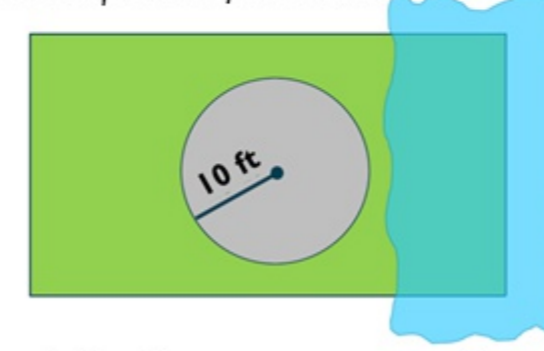
Building & land impacted

Total parcel value considered



Land only impacted

Proportional percent of value considered



Building footprints were represented using the parcel center buffered by 10 ft

Questions & Answers

Q: There was a study done a couple of years ago to investigate the floodplain at Wells Beach areas. In an update meeting the consultant stated that NOAA had used west coast topography when determining our flood zone. I remember that Wells had to pay \$89K to challenge this. Are we sure the topography maps are correct?

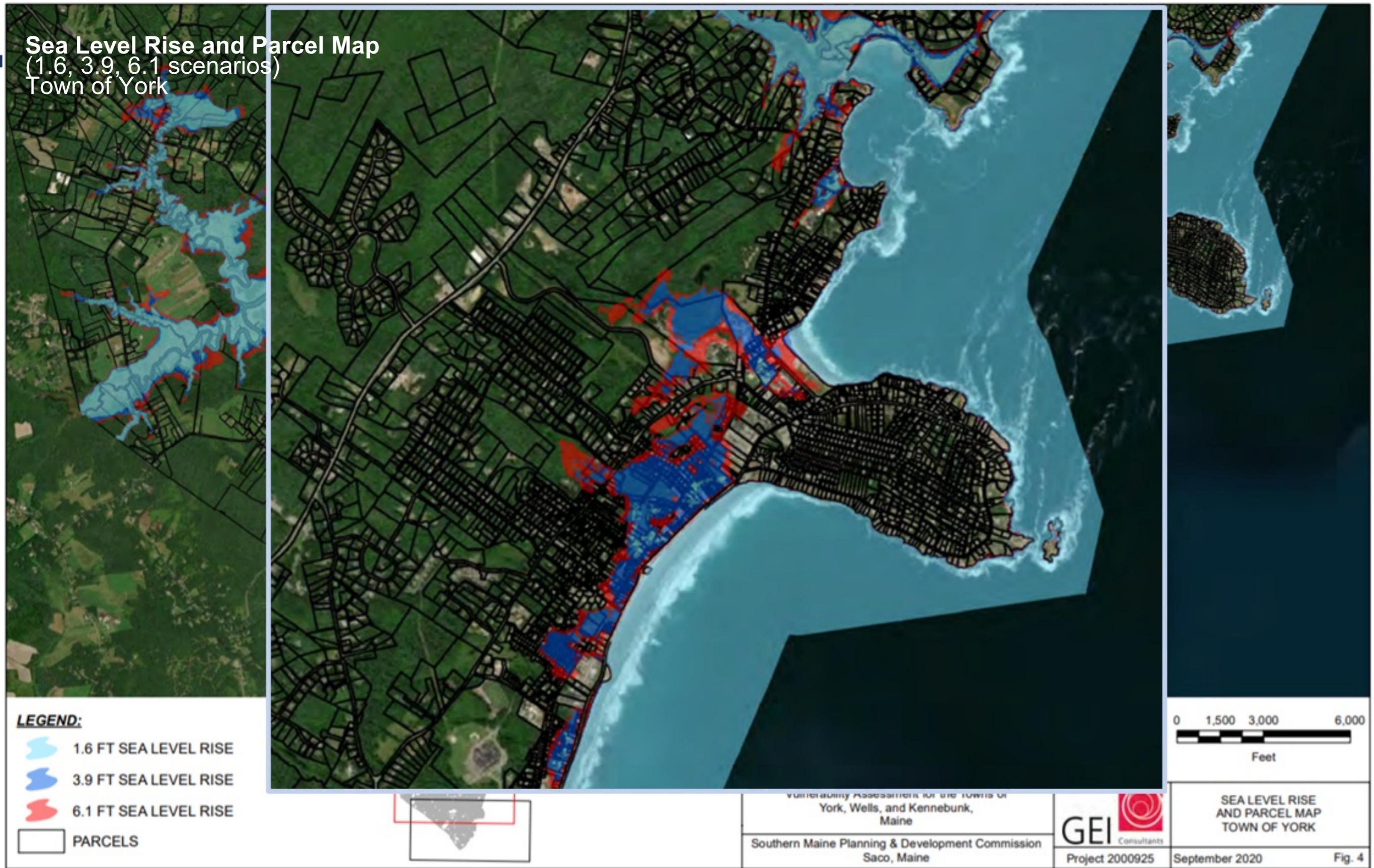
Team Notes: The sea level rise data and maps used for this project are based on state and local data, including local topography, and are **not** related to or based on floodplain maps produced by the Federal Emergency Management Agency (FEMA). FEMA floodplain maps, or Flood Insurance Rate Maps (FIRMs) show flood hazard areas associated with the 100-year storm event, are based on historical data, do **not** account for future sea level rise, and are tied to federal flood insurance requirements and the Town's Floodplain Management Ordinance, which outlines development requirements 100-year floodplain. FEMA has been working to produce updated FIRMs for York County for a number of years. The current effective FIRMs for Wells and other York County communities are from 2003 and are out of date. FEMA uses computer modeling to determine the 100-year floodplain for areas, and that modeling uses location-specific topography as well as information and assumptions about how water 'behaves' or acts in certain areas, including how it acts in the ocean as it approaches and runs up on to land. Wells was involved in a group of towns that appealed the most recently released FIRMs, arguing that the hydrologic modeling and resulting floodplain maps overestimated the extent and water depth of the 100-year floodplain in some areas. The appeal process has largely been resolved and it is anticipated that FEMA will be issuing new FIRMs for York County within the next year.

Summary Notes

GIS vulnerability assessment

- For this project, a geographic information system, or GIS, was used to assess the impacts of the three flooding scenarios in each of the project towns. To accomplish this, the team used municipal geospatial data, parcel information (including the assessed value of properties, which Town staff helped us to assemble) US Census data, and sea level rise and storm surge projections developed by the Maine Geological Survey. For each of the three flooding scenarios, polygons depicting the inundation extent of each scenario were overlaid with the other geospatial data layers, as illustrated by the “pancake stack” graphic, to assess what was impacted by inundation and to what degree.
- For this project, ‘impacted’ means touched by water.
- In instances where certain data were not available, the assessment relied on assumptions to assess impacts. For example, building footprint data were not available for any of the towns, so in order to assess impacts to buildings, the GIS team created representative building footprints. They identified developed parcels, or those that have buildings on them based on town data, determined the center point of each parcel, then buffered the center point with a 10-foot radius circle to represent the approximate location of a structure, as shown in the graphic on the right-hand side of the screen.
- If the circle that represented the building footprint was ‘touched’ by flood inundation polygons, both the land value and building value were considered impacted.
- If the inundation only touched the land-portion of the parcel and not the building footprint, only that proportion of the land value was considered impacted.

Sea Level Rise and Parcel Map
(1.6, 3.9, 6.1 scenarios)
Town of York



Summary Notes

Town-wide inundation map

- The next slides show inundation maps and results of the GIS-based vulnerability assessment. This map shows the mapped inundation boundaries for all three of the flood scenarios, with light blue showing inundation from 1.6 feet, dark blue showing 3.9 feet, and red showing 6.1 feet of sea level rise or storm surge.

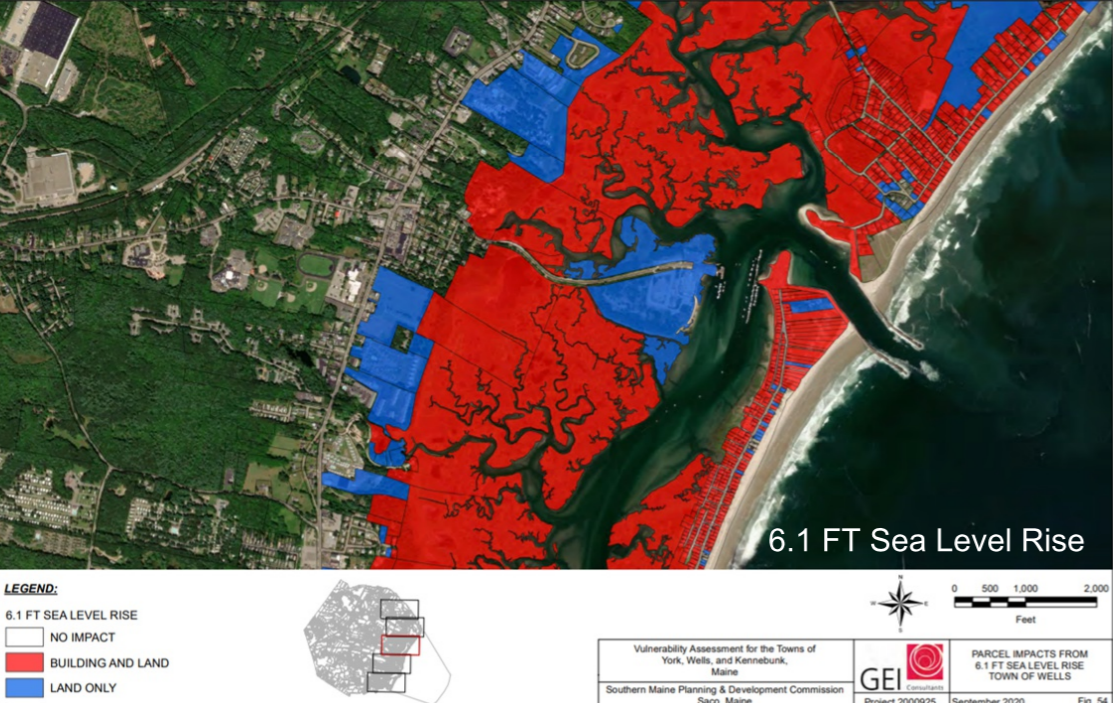
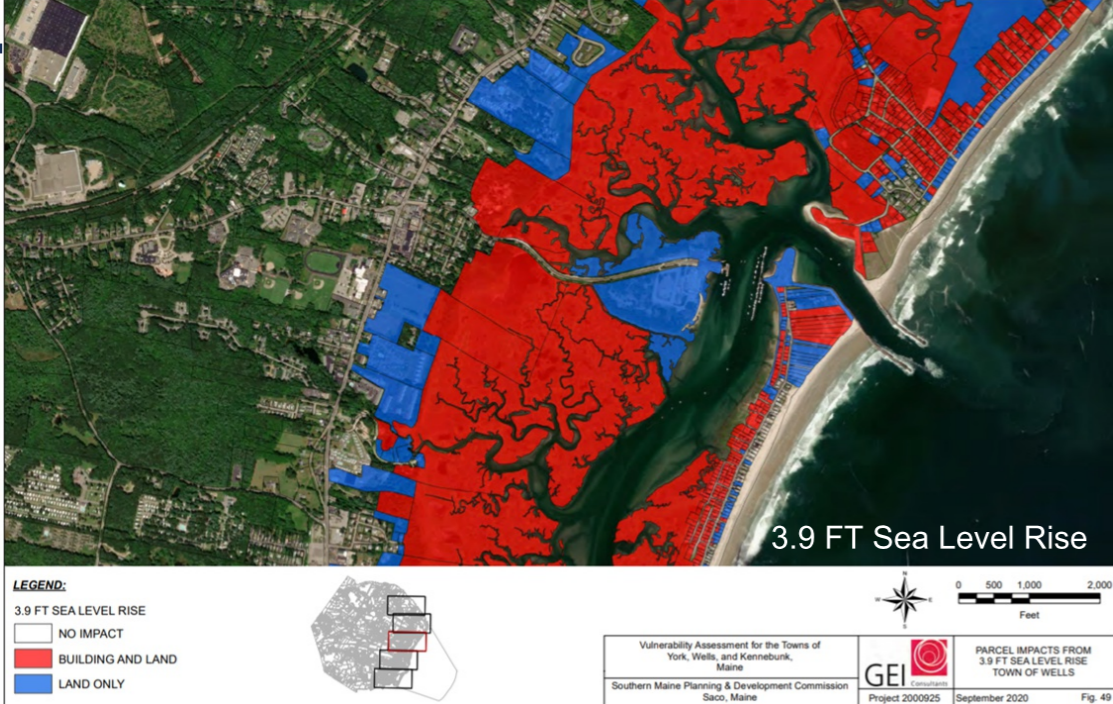
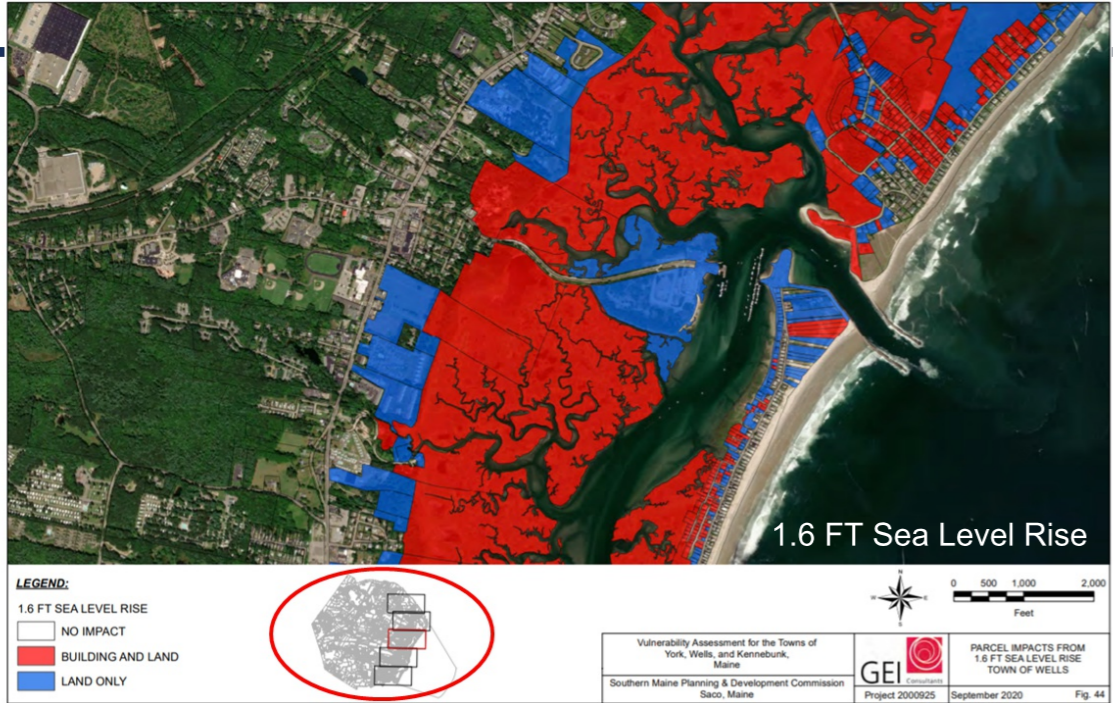
- All of these maps and figures are included in the vulnerability assessment report developed by GEI Consulting, which was sent to everyone who registered for this workshop and is available on SMPDC's website.
- The map images in the PDF report are high resolution, so you can zoom into areas of interest.

Parcel Impacts from Sea Level Rise

Summary Notes

Parcel Maps

- These maps are examples from the report and show impacted parcels for each of the three flooding scenarios, starting with 1.6 feet and moving to 6.1 feet so you can see the change with increased flooding scenarios. • If any part of a parcel was impacted, the entire parcel is shaded either blue or red. Blue parcels represent those that had only land impacted while red parcels represent those that had both land and buildings impacted, or ‘touched’ by water.
- Note that the legend at the bottom of the slide with the red call-out box shows what area of town is being depicted. In this case, the area surrounding Wells Harbor. The report divides Wells into 5 areas, shown by each black box in the legend, and includes maps for each scenario and each area of town.
- You can see that as the flooding scenario increases, more of the parcels are red, meaning the inundation extends into the parcels to touch the estimated locations of building footprints.
- Although most of the parcels along the front and back sides of the barrier beach are impacted, notice that there are large swaths of impacted areas around the estuary/marsh, but most of those areas have very few parcels and very little development due to effective land conservation efforts and development setbacks designed to protect the marsh habitat. For Wells, those measures have reduced the potential impacts to structures and buffer the economic impacts to the Town’s tax base in terms of the value of impacted property.



Questions & Answers

Q: With rising sea levels what are expected impacts to sewage treatment plants, fresh water impacts? Will rising sea levels have fresh water be impacted and become brackish as the seawater seeps deeper into the landfall. Will the Public KKW water supply be impacted, where do they draw the water from?

Team Notes: The Ogunquit Sewer Department and Wells Sanitary District have studied the impacts of sea level rise on their treatment plants. More on groundwater impacts from the NH Climate Adaptation Workgroup’s workshop summary: [As Sea Level Rises Groundwater Does Too](#).

Kennebunk, Kennebunkport, and Wells Water District provided this statement:
The KKW Water District has done considerable planning for sea level rise. In 2019 and 2020 the District participated in the Maine Flood Resilience Checklist with the Town of Wells and other neighboring utilities. The checklist identified our risk and vulnerability, critical infrastructure and facilities, community planning, social and economic vulnerability and the natural environment. The checklist and a series of workshops resulted in a Summary and Recommendations Report developed by FB Environmental Associates. Aside from this report, the District is also required by the EPA to develop a Risk Assessment and Emergency Response plan as part of the America's Water Infrastructure Act.

We are fortunate that our primary drinking water source, branch brook, should not be impacted by sea level rise in the near future. At 14 feet above sea level we can be assured that it will take many years for the sea level to impact the dam and impoundment. Branch Brook supplies about 60% of our water and the remaining 40% is supplied by four (4) groundwater wells. The District’s primary groundwater well supplies 25% of our water and is located in West Kennebunk, at an elevation of 82’ above sea level. We feel that saltwater intrusion would be unlikely at this site due to its distance from the ocean and the well depth. If there was a catastrophic event, terrorist attack, or significant unplanned sea-level rise we can purchase water from neighboring water utilities. In an effort to minimize any potential for loss of a water supply, we should have enough redundancy to operate without any of our sources. We are connected to Maine Water – Biddeford-Saco. The source water for Biddeford-Saco is the Saco river which has a safe yield of 1 Billion gallons a day and a typical flow of 2 billion gallons a day. KKWWD averages about 1 billion gallons a year. Biddeford-Saco is also interconnected with the Portland Water District and are currently planning a larger interconnection. We also have an interconnection to our south with the York Water District and they have an interconnection with the Kittery Water District. This planning for source water redundancy in southern Maine is through a collaborative of southern Maine water districts who are members of the Southern Maine Water Utilities Association. Their active planning and partnership help keep southern Maine water utilities more resilient to emergencies and unplanned issues that may arise.

DRAKES ISLAND

1.6 ft



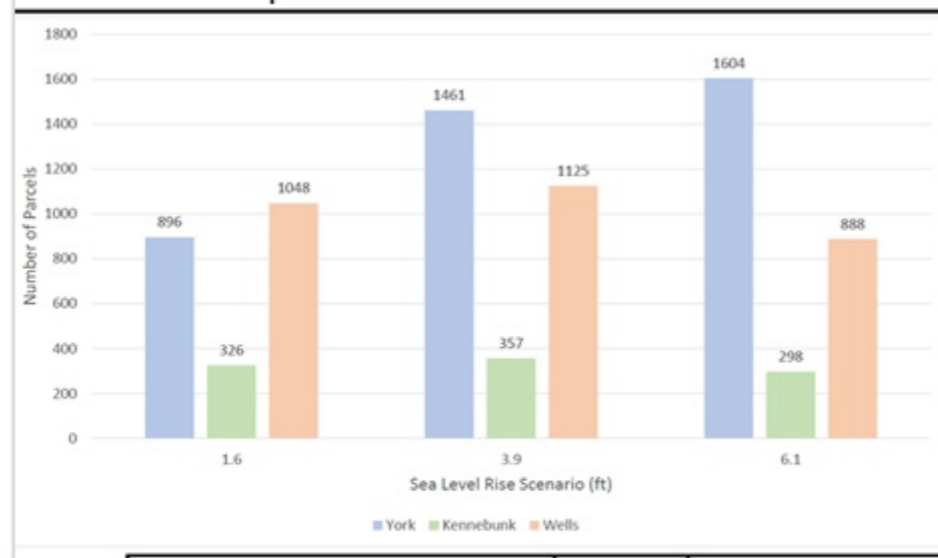
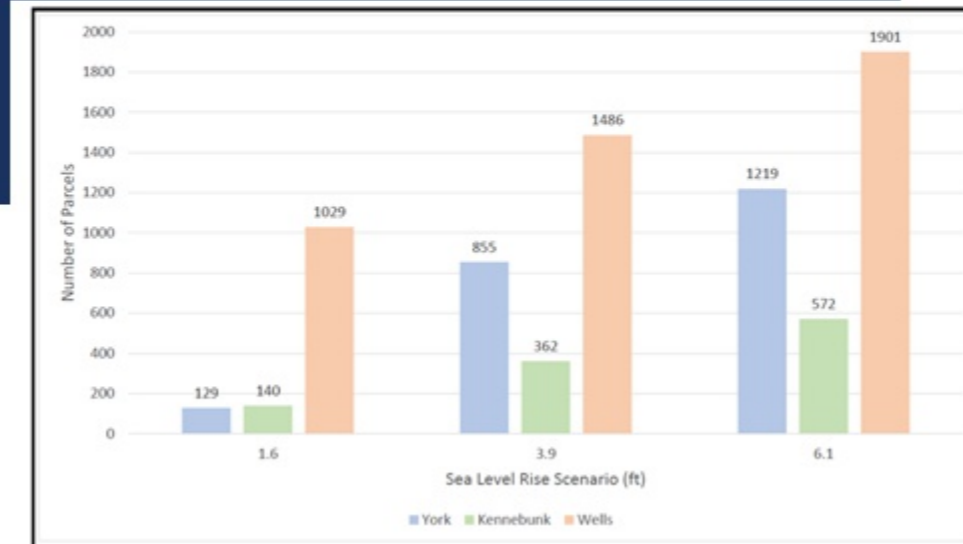
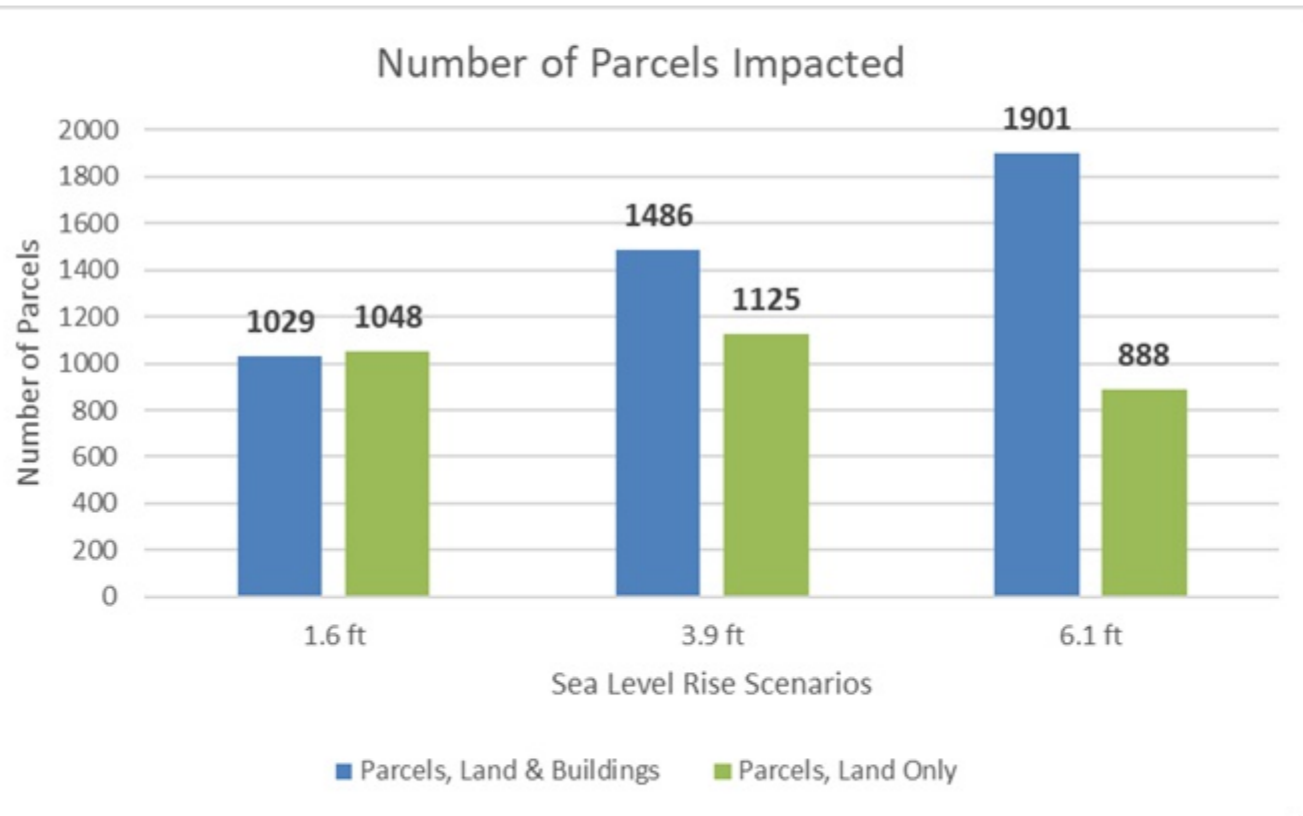
3.9 ft



Summary Notes

Drakes Island
These side-by-side maps show a comparison of the Drakes Island area under 3.9 and 6.1 feet of flooding, and is included to show that you can use the report maps to zoom into areas of interest.

RESULTS: NUMBER OF IMPACTED PARCELS



NUMBER OF PARCELS WITH BUILDINGS AND LAND IMPACTED BY SEA LEVEL RISE
September 2020 Fig. 88

Vulnerability Assessment for the Towns of York, Wells, and Kennebunk, Maine	GEI 	NUMBER OF PARCELS WITH ONLY LAND IMPACTED BY SEA LEVEL RISE
Southern Maine Planning & Development Commission Saco, Maine	Project 2000925	September 2020 Fig. 89

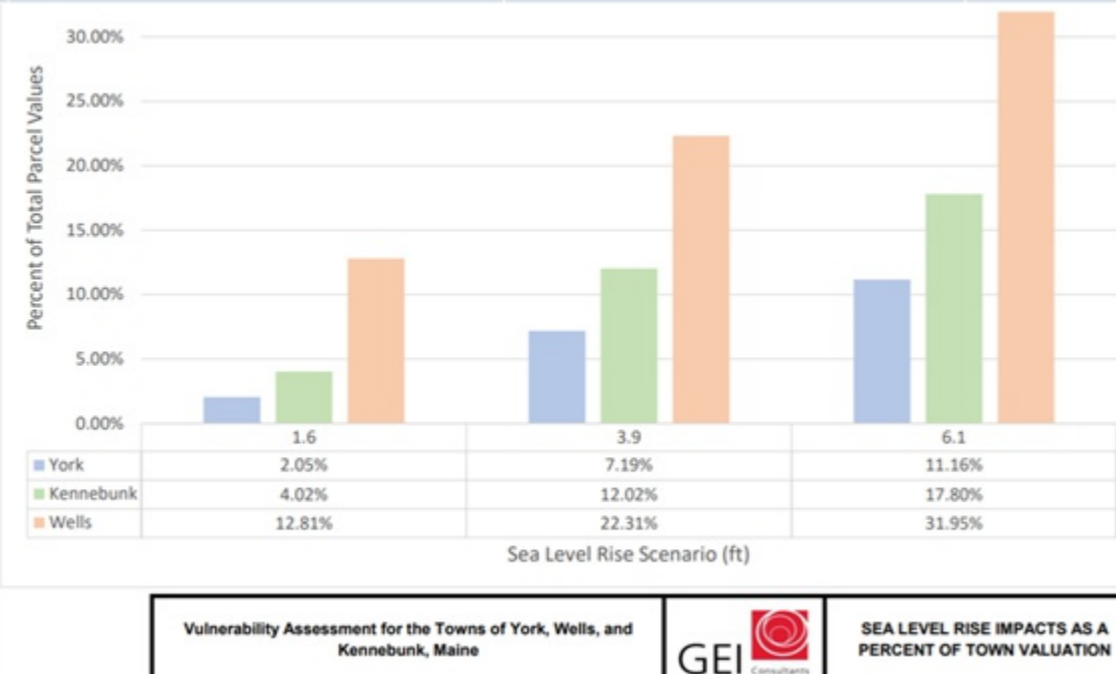
Summary Notes

Results: Number of Impacted Parcels

- This graph shows the number of parcels impacted by each of the three flood scenarios, differentiated by parcels with impacts to land and buildings compared with the number of parcels with only land impacted.
- These charts show the same results for Wells compared with the other two towns. Wells' results are represented by the orange bars, York's by blue, and Kennebunk by green.
- Wells has the greatest number of parcels with impacts to buildings and land across the three sea level rise scenarios, but a smaller number of parcels with impacts to only land than York for 3.9 and 6.1 feet.
- You might notice that the number of parcels with impacts to only land decreases from 3.9 to 6.1 feet of sea level rise. That is because with 6.1 feet of rise, the inundation extends further inland and therefore 'touches' the area of the parcel where a structure would likely be, those parcels change from the "land only" impact category to the "land with buildings" impact category.

RESULTS: ASSESSED VALUE OF IMPACTED PARCELS

Sea Level Rise Scenario	Assessed Value Impacted	Impact as % of Town-Wide Assessed Value	Impact as % of 2020 Town Budget
1.6 ft	\$433,185,221	12.8%	21.4%
3.9 ft	\$754,619,443	22.3%	35.2%
6.1 ft	\$1,080,587,296	32%	50.4%



Summary Notes

Results: Assessed Value of Impacted Parcels

- This table shows the assessed value of impacted parcels, the impacted value as a percentage of town-wide assessed value, and as a percentage of the 2020 town budget for each flooding scenario. You can see that even 1.6 feet of sea level rise puts roughly \$433 million at risk of flooding, which is almost 13% of the town's 2020 budget. 6.1 feet of rise puts almost 40% of the total assessed property value in Town at risk, total over \$1 billion.
- The graph shows the same information for Wells compared with the other project towns.
- It is important to note here that just because a parcel and its value is impacted, the total value is not lost. These results simply reflect the parcels that will likely be at least partly touched by water at high tide for each of the given scenarios.

RESULTS: IMPACTS TO MUNICIPAL ASSETS

Asset (unit of measurement)	Total Amount	Impacts from SLR			Percent of Total		
		1.6	3.9	6.1	1.6	3.9	6.1
ZONING DISTRICTS (sq ft)							
AP	37,944,169	0	0	5,776	0%	0%	0%
BB	1,107,352	289,547	531,026	655,259	26%	48%	59%
GB	42,338,961	1,555,431	2,434,928	3,239,980	4%	6%	8%
H	2,008,006	651,013	865,708	1,501,807	32%	43%	75%
LI	46,569,108	0	0	0	0%	0%	0%
QM	16,299,678	0	0	0	0%	0%	0%
R	1,079,089,398	486,106	693,532	906,844	0%	0%	0%
RA	202,365,653	2,399,416	4,078,959	5,508,189	1%	2%	3%
RB	10,080,410	3,955,550	5,970,347	7,477,347	39%	59%	74%
RC	28,660,343	0	0	0	0%	0%	0%
RD	4,760,696	2,511,904	3,590,625	4,248,042	53%	75%	89%
RP	121,466,824	59,731,557	61,970,572	63,538,657	49%	51%	52%
TC	2,321,883	0	0	0	0%	0%	0%
Right of ways (sq ft)	66,404,366	1,313,134	2,485,795	3,201,958	2%	4%	5%
Wells Roads (ft)	1,063,374	35,053	64,071	80,142	3%	6%	8%
Wells pressurized mains (ft)	28,621	7,596	9,075	10,052	27%	32%	35%
Wells gravity mains (ft)	286,065	28,982	54,525	71,221	10%	19%	25%
Wells fire stations (n)	3	0	0	0	0%	0%	0%
Wells pumps (n)	16	0	0	0	0%	0%	0%
Wells manholes (n)	1,425	147	267	352	10%	19%	25%

Summary Notes

Results: Impacts to Municipal Assets and Zoning Districts

- The vulnerability assessment also examined impacts to certain municipal assets and infrastructure, as well as impacts to areas based on town zoning districts, which is helpful to know for infrastructure planning and pursuing and crafting land use measures that aim to reduce flood risk of new and redevelopment in vulnerable zoning districts.
- These red boxes highlight some impacts of interest, including linear feet of roadways impacted, gravity and pressurized mains impacted, and manholes impacted by the three inundation scenarios. This information is also included in the vulnerability assessment report completed by GEI.
- The RD, or Residential Drakes Island District, has the greatest % of land impacted of all zoning districts. The Resource Protection District (RP), Beach Business District (BB), and Harbor District (H) also have significant impacts in terms of the percentage of the zone impacted.

SOCIAL & ECONOMIC ANALYSIS

Inputs

- State data
- Census data
- Results of GIS vulnerability assessment

Outputs

- Economic profile of towns
- Population demographics
 - Age, income, poverty, housing occupancy
- Economic impacts – town and region
 - Businesses, industries, employment, salaries, economic output
 - Direct, indirect, and induced effects
- Fiscal impacts
 - Property taxes, municipal budget, commercial taxes and fees



Summary Notes

Socio-Economic Analysis

- In addition to the GIS-based vulnerability assessment, the project also looked at the social and economic impacts of coastal flooding. This portion of the project was led by rbouvier consulting and used socio-economic data from state and federal sources as well as results of the GIS assessment to evaluate broader economic impacts of sea level rise and storm surge to towns and the region.
- The analysis generated economic profiles of each town, information about populations and demographics impacted by flooding, number and type of impacted businesses, employee numbers and annual wages at risk, impacts to economic activity, and municipal fiscal impacts. Some results are presented based on Census Block Groups. These results are summarized in the socio-economic report developed by Rachel and her team.

Questions & Answers

Q: Rachel, thoughts about secondary impacts for businesses, can you reflect on that?

A: Rachel/rbouvier consulting: As Abbie said, we only looked at the direct impacts -- the impacts of businesses that are going to be directly affected by Sea Level Rise. However you can think of the businesses in town as being an ecosystem. They all work together. It's not as if, if you have one eatery or business close down because of encroaching sea level, that business is isolated. All the tourism businesses work together, they act together to create the vibrancy that Wells has, without that there are going to be secondary effects. I'll be working with Abbie on a phase 2 of the project. We'll be looking at these regional effects to tourism, beach loss, and that sort of thing.

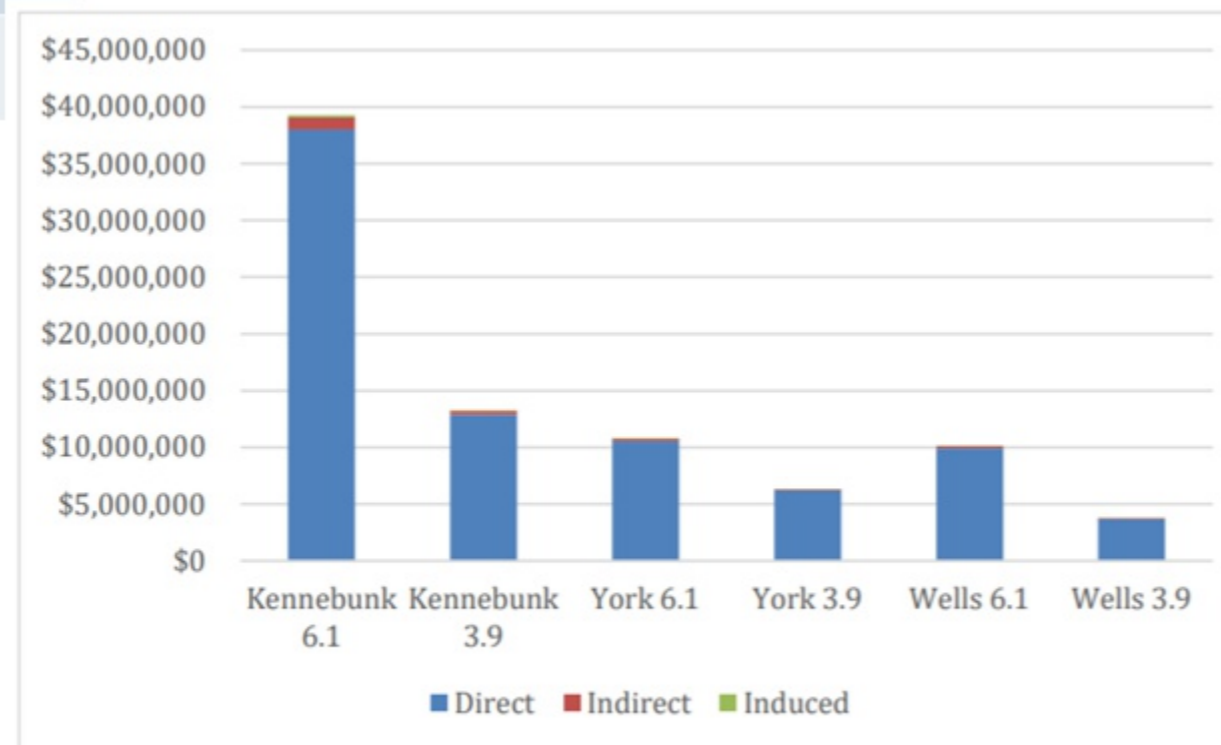
RESULTS: IMPACTS TO BUSINESSES AND ECONOMIC OUTPUT

Sea Level Rise Scenario	Number of Businesses Directly Impacted	Number of Employees	Percent of Total Employment in Town
3.9 ft	11	81	1.4%
6.1 ft	20	186	3.3%

Based on 2019 data from the Maine Dept. of Labor and Data Axle

6.1 ft of sea level rise would put nearly **\$110 million** of economic output at risk in York County, from just the three project towns

Town Economic Output at Risk



Summary Notes

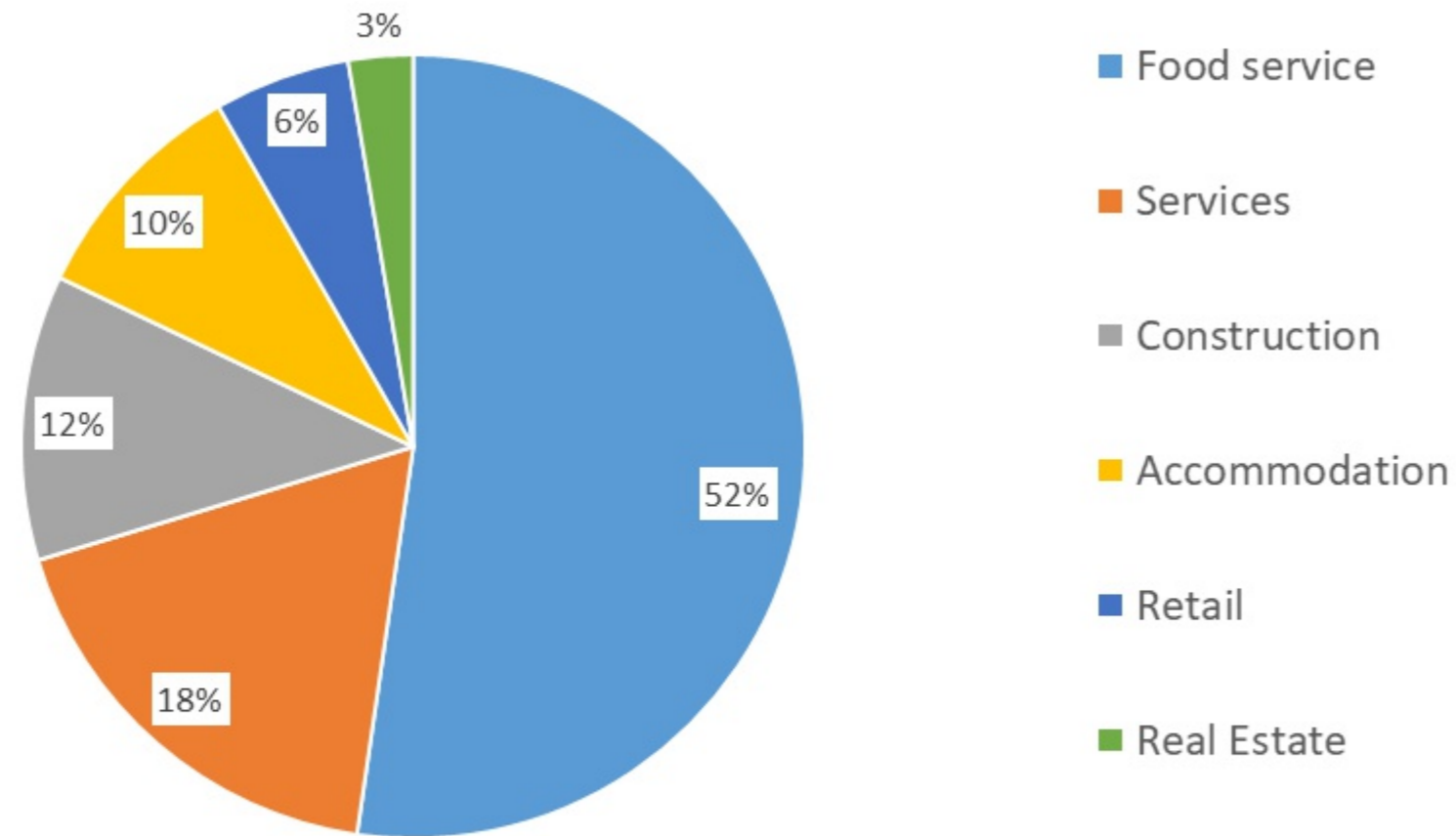
Results: Impacts to Business & Economic Output

- The economic analysis showed that 11 businesses with 81 total employees would be directly impacted by 3.9 feet of sea level rise. Under 6.1 feet of sea level rise, those numbers jump to 20 businesses and 186 employees, representing 3.3% of the total employment in Wells.
- The graph on the right shows the total output, value added, and employee compensation at direct risk from 3.9 and 6.1 feet of sea level rise.
- It is important to note that those numbers represent the number of businesses and employees directly impacted by the inundation scenarios, meaning the parcels of those businesses are 'touched' by water'. The results do not account businesses that could be affected by secondary impacts, such as decreased tourism activity or fishermen who rely on piers and docks being high and dry to offload and sell their catch.

- To evaluate other impacts, Rachel's team used an economic assessment software to determine the indirect and induced effects of sea level rise. Induced effects include the supply chain effects, for example, when a restaurant buys bread from a local bakery, and the induced effects are when a local employee spends their money locally, such as a restaurant employee buying their groceries at the local grocery store.
- The analysis found that under 6.1 feet of sea level rise, \$110 million of economic output at risk in York County, just from those three towns alone.

RESULTS: INDUSTRY IMPACTS

Industry Breakdown of Output Associated with 6.1 feet of SLR: Wells



Summary Notes

Results: Industry Impacts

• The analysis also evaluated the industries at greatest direct risk from flooding. In Wells, more than half, or 52%, of the total economic output impacted by 6.1 feet of sea level rise is concentrated in the restaurant or food service industry. The second most impacted industry in Wells is the 'services' industry.

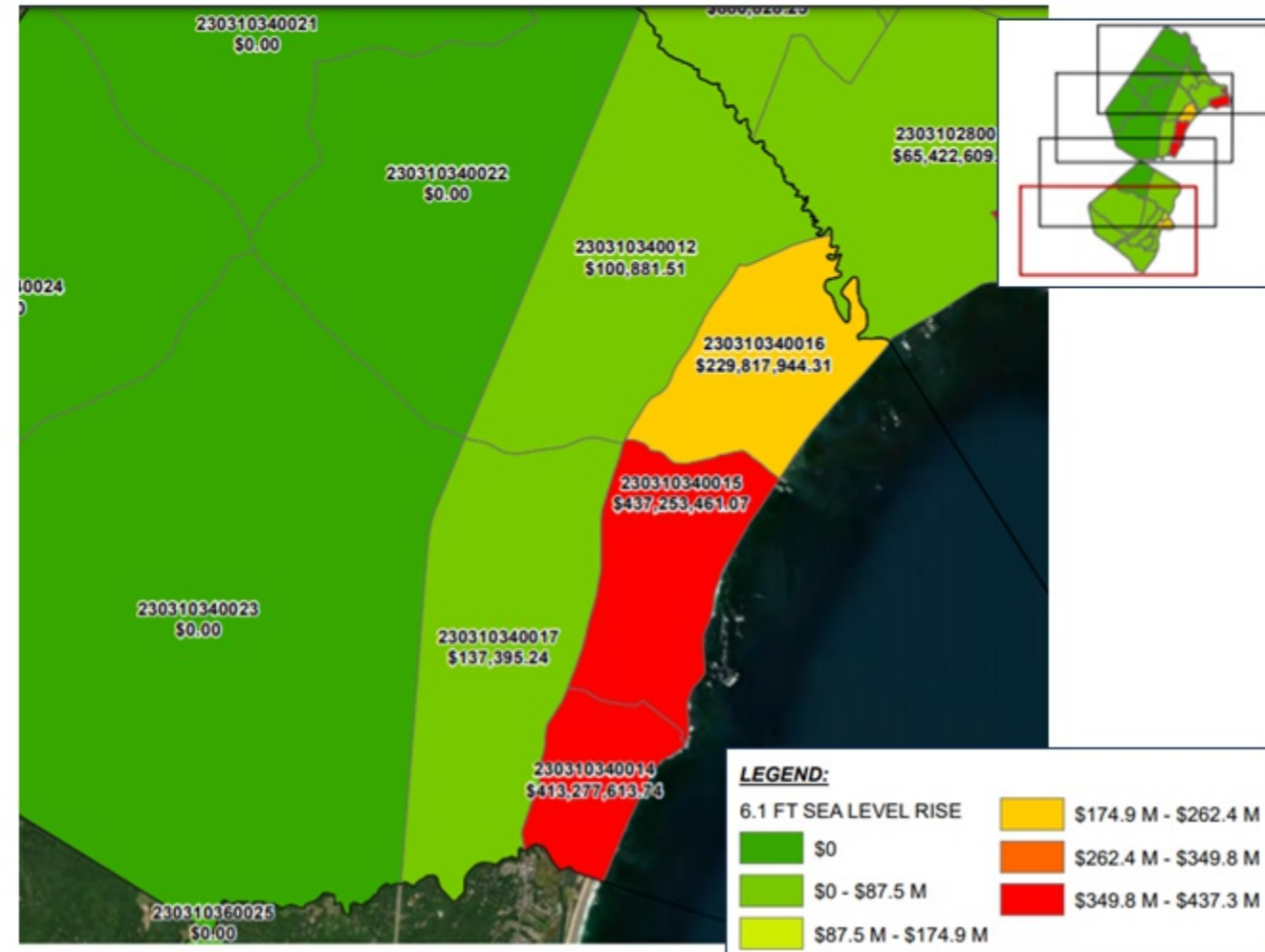
RESULTS: HOUSING OCCUPANCY

Housing occupancy rates within block groups with greatest impact from 6.1 ft sea level rise

Block Group	Total Residences	%Unoccupied
0360012 (York)	1564	82%
0340015 (Wells)	1551	81%
0340014 (Wells)	964	59%
0280022 (Kennebunk)	949	58%
0280021 (Kennebunk)	896	14%
0360015 (York)	278	59%

Table 7 of report. Occupancy rates 2018-2019. Data source: US Census 2020

- Large amount of seasonal and rental housing
- Contributes to tourism activity
- Economic impact not accounted for by analysis



Summary Notes

Results: Housing Occupancy

- Like other area towns, Wells has a relatively large amount of seasonal and rental housing which contributes to the local economy as well as the municipal tax base. While economic activity associated with seasonal and rental housing was not assessed through this project, housing occupancy rates within inundation areas was evaluated to provide towns with a better sense of impacts.
- This table shows the percent of unoccupied homes within the Census block groups that are most impacted by 6.1 feet of sea level rise and the map shows the Census block groups and the total assessed value impacted within each block group.

- Looking at the table and map, we can see that 81% and 59% of residences unoccupied by permanent residents in the two Census groups ('0340015' and '0340014') that have the largest amount of assessed property value impacted by 6.1 feet of sea level rise in the town, as shown in red/orange in the map.
- This is important because, as previously noted, seasonal and rental housing plays a significant role in the local economy, supporting tourism activity and generating local revenue.



DISCUSSION, Q&A

Q: Abbie, can you share the bigger regional- picture for participants?

Abbie/SMPDC: A lot of ongoing efforts in southern Maine. Looking at impacts of sea level rise and various coastal hazards in order to help communities plan and prepare for the future. One effort is funded by the Economic Development Administration, which will involve SMPDC working with Wells and 5 other coastal York County towns to take what we've done with this project (Tides, Taxes, & New Tactics) looking at impacts to assessed property values and impacts to broader socioeconomic conditions in the region and take a more in depth look into regional impacts associated with coastal storm events and future sea level rise. That project will also develop strategies and recommendations for enhancing regional and municipal flood resilience. This project feeds into that expanded regional effort. Build on work we have been doing and provide additional information to our towns, to help guide future adaptation, mitigation, and resilience planning.

Q: We know storms push more water in, above high tides. So even with 1-3 ft of rise, noreasters often add 2-4 ft on top of a high tide, (as they have in the past). So we could see times when 6-7 feet of flooding occur in the next 20 years? Do we know if enough properties have flood insurance in that zone?

Abbie/SMPDC: There are privacy laws about sharing information regarding who carries flood insurance, so it is not publicly available on a parcel level. But the town has access to information from the State Floodplain Management Program and FEMA's National Flood Insurance Program about the level and extent of coverage in the flood zones. The Town can use the information to evaluate the level of flood insurance coverage in a way that it doesn't conflict with any privacy rules or regulations.

Mike/Planner: A lot of properties down along the coast already have flood insurance, but properties aren't required to have flood insurance if they don't have a federally-backed mortgage on the property. So the trigger for requiring flood insurance is when, for a property located in the 100-year floodplain, you have a lender that requires flood insurance coverage for any federally-backed mortgage, based on federal lending law. But we do have many properties with flood insurance and have a certain percentage that don't as well. As ownership changes and people get mortgages on properties, that tends to go up. We have another issue coming up in the next few years - the change to the flood maps. When the flood maps change and elevation of flood zones increase for the 100-year flood event, a lot more properties will be required to get flood insurance.

Larissa/Manager: The Town has been working hard with attorneys on the flood maps and that is going to be a larger community conversation that will heighten peoples' awareness that they should be looking towards flood insurance if they don't hold a mortgage. That will be part of the community engagement piece as we move forward with this so people are aware of when they should and should not have flood insurance.

Q: Thoughts on using this information for future program planning for the Planning Department and town administration?

Mike/Planner: Information gathered from the two reports and how it reflects on the future of Wells fits perfectly with the Towns upcoming Comprehensive Planning Update, we'll be working this information right into it.

Larissa/Manager: When I first saw this presentation in draft form [December 2020], felt 'privileged' to be the hardest hit of the three towns, but at a closer look the Town of Wells is fairly well positioned. I like that you mentioned that we have been thoughtful and aggressive in our conservation of land and are doing a good job making sure we have space for water to go. We also, from a loss of business standpoint--this is one of those places where a lack of a downtown is serving us well--Kennebunk is being hit so hard financially because of their downtown adjacent to Kennebunkport. And as we're talking about moving forward with the comprehensive plan process and growth pattern discussions in general, certainly using this data in general, if the Town does decide it wishes to pursue the creation of a downtown center, making sure that that downtown center is well away from any waterfront. And from a tax-base preservation standpoint, we do see our heaviest development taking place west of the turnpike, certainly west of Route 1, which will be shielded from a lot of these impacts, and there is wanting to do that judiciously and not endangering the character of the town, but it is encouraging to see we have the capacity to maintain a tax base in a year round capacity in those parts of town, so 50 years from now the people of Wells will not suddenly find themselves with the equivalent of a paper mill going out of business. There is space here for the Town of Wells to be thoughtful and prepare for the future.

Q: Is this something you want the public to get to know more about, so they are aware of what we need to look forward to in the future or how we can try to address it and go forward with this information? Where does it go from here? Are we going to provide information to more of the residents in the town so they understand and are there things we can do -- like something out in the ocean that works like the jetties do (not that our jetties work). Is there hope down the line?

Annie/Wells Reserve: We definitely want to get community involvement. We will be talking next about strategies other communities are taking. This meeting is to get the municipal pulse on what next steps make sense. A lot of you are in the driver's seat in town and have a better understanding and we want to get your sense on the best ways to engage the public as well. This is the beginning of the conversation.

Team Notes: To follow up on the question about a physical structure, that would involve the State and Federal agencies. The State recognizes and has acknowledged the need for coastal resilience efforts state-wide. The recently released 4-year Climate Action Plan 'Maine Won't Wait' includes strategies and and recommendations for assisting and supporting municipalities with preparing for coastal flood hazards.

Q: What is being done regarding an environmental assessment?

Team Notes: The Maine Climate Council's Scientific and Technical Subcommittee's [Scientific Assessment of Climate Change and Its Effects in Maine](#) provides an overview of anticipated impacts on Maine's environment.

Participant Comments

If the ocean rises, that also means the lakes, rivers, brooks will all rise too.

Team Notes: Sea level rise will also cause tidally influenced waterbodies, including the Webhannet and Little Rivers, to rise. Climate change is also projected to cause more frequent and intense precipitation events in Maine, which will also impact short-term water levels and flow of freshwater bodies.



COASTAL RESILIENCE STRATEGIES

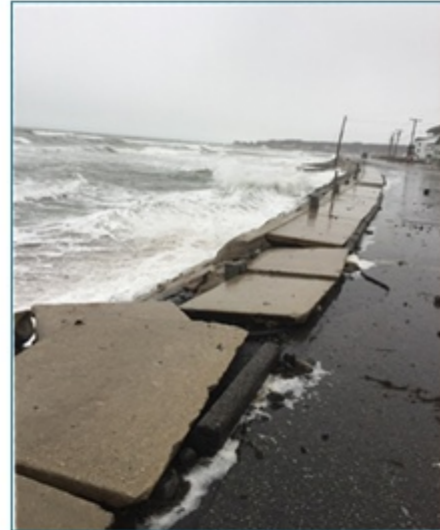
Photo credit: P. Dest

Summary Notes

A major part of this project is focused on providing information about what the towns can do to act on the project results to reduce risk and enhance resilience. In other words, trying to provide answers to the question of “ok, now what?” that usually comes up after an assessment like this is complete.

WHAT CAN THE TOWN DO TO PREPARE?

- **\$1 in mitigation saves \$6**
- Municipal action is vital
 - Home Rule = Opportunities!
- No “one size fits all” approach
- Addressing the range of impacts and vulnerabilities requires employing a range of solutions



- Integrate resilience measures into existing plans, policies, and land use tools
 - Floodplain management ordinance
 - Increase freeboard requirement
 - Tidal culvert repair
 - Upsize culverts to handle additional flows and design based on future sea level rise
 - Capital Improvement Plan
 - Include coastal resilience criteria

Summary Notes

What Can the Town do to Prepare?

- To that end, the team is developing tailored resilience planning strategies to help Wells and the region prepare for sea level rise and protect people, property, and municipal resources now and into the future.
- We know that investing in adaptation and mitigation activities now saves money in the long run. The National Institute of Building Sciences found that every \$1 spent on disaster mitigation saves \$6 in response and recovery.
- Fortunately, our towns have a number of options to address coastal flooding. Municipal action is critical for addressing climate impacts and Maine’s home rule status offers plenty of opportunities for towns to develop tailored solutions to address local vulnerabilities, conditions, and needs.

- While the challenges posed by future sea level rise may seem overwhelming, the good news is that we tackle impacts incrementally through a variety of different options. Flood resilience measures can be integrated into existing planning, policy, and regulatory tools. For example, existing floodplain management ordinances can incorporate better flood risk reduction measures such as increased freeboard, or the elevation to which structures must be built, to account for future flooding. Municipal culverts can be upsized to accommodate increased water flows and higher tidal elevations. Municipal expenditures can be informed by coastal impact assessments.

RESILIENCE AND ADAPTATION STRATEGIES



Protect



Accommodate



Realign

Summary Notes

Strategies – Protect/Accommodate/Realign

- Adaptation and mitigation strategies such as these are usually organized into three overarching categories: protect, accommodate, and realign. Protect means to fortify against flood waters, such as by building a seawall. Accommodate means to design things in a way that allows water to move freely while reducing risk, such as elevating a house on piers. Realign means to adjust the built environment and where we develop to avoid areas at-risk of flooding and other coastal hazards. While some options can be more contentious than others, it is important for municipalities to begin conversations now about vulnerabilities and potential solutions so that they can begin to prepare and plan for those solutions.

EXAMPLE STRATEGIES



Photo: Woods Hole Group

Relocation of beach parking lot landward and dune restoration and enhancement

Nauset Beach, Orleans, MA



Coastal resilience overlay zoning district with provisions for reducing flood risk while stimulating mixed-use development

Hull, MA



Public park designed to serve as a flood storage area near coastal wetlands

Beverly, MA

Summary Notes

Example strategies

- Examples that have been used in nearby areas include relocating beach parking lots, developing coastal resilience overlay zoning districts with development standards designed to decrease flood risk, and designing public areas that can be flooded when needed and serve recreational purposes when dry.

STRATEGIES FOR ENHANCING MUNICIPAL FLOOD RESILIENCE

Coastal Resilience Strategies		DRAFT		THIS SPREADSHEET COMPILED BY SMPDC		SMPDC		
Strategy Name	Hazard Category	Subhazard	Type	Municipal	State	Strategy	Substrategy	Description
Local Wetland Ordinance w/ Flood Resilience Zones	Natural Resource	Wetland Conser	Retreat	Boston	MA	Regulatory	Zoning	Establishes a "Waterfront Area" that will serve as a buffer zone and allow for implementation of the Resilient Boston Harbor Plan and creation of Flood Resilience Zones. Also protects isolated vegetated wetlands, vernal pools, and vernal pool habitat. Allows Cons Comm to develop standards for projects in floodplain to ensure resiliency measures are incorporated and expressly directs the Comm to consider climate change, SLR, and climate resiliency. Creates Flood Resilience Zones
Tax increment reinvestment zones (think same as TIF)	Coastal Resilienc	All	Funding	Houston	TX	Local financing	TIF	An economic development tool that captures projected increase tax revenue that is created by a development within a defined area and reinvests those funds into public improvements and development projects that benefit the zone.
Environmental impact bond	Coastal Resilienc	All	Funding		Louisiana	Local financing	Bond	Form of 'pay-for-success' debt financing in which investors purchase a bond and repayment to investors is linked to the achievement of a desired environmental outcome
Coastal Trust Fund	Coastal Resilienc	All	Funding		Louisiana	State financing		
Coastal Resilience Overlay Zone	Coastal Flooding	Sea Level Rise	Accommodate	Portland	ME	Regulatory	Zoning	Zoning district designated by coastal hazard risk / vulnerability for the purpose of applying development standards and performance measures to reduce risk and enhance resilience
		Sea Level Rise		Sandwich	MA			
		Sea Level Rise		Falmouth	MA			
		Sea Level Rise		Harwich	MA			
Managed relocation	Coastal Flooding	Sea Level Rise	Retreat	Brewster (Br)	MA	Policy	Land use	Managed retreat, or the voluntary movement and transition of people and ecosystems away from vulnerable coastal areas, is increasingly becoming part of the conversation as coastal states and communities face difficult questions on how best to protect people, development, infrastructure, and coastal ecosystems from sea-level rise, flooding, and land loss.
Conservancy overlay district - prohibition of new residential dwelling unit in district & regulatory floodplain and prohibition of new structures VE Zone	Coastal Flooding	Sea Level Rise, Precipitation and Stormwater, Storm Surge	Retreat	Chatham	MA	Regulatory	Zoning	Conservancy District: Purpose: d) protect persons and property from the hazards of flood and tidal waters which may result from unsuitable development in or near swamps, ponds, bogs and marshes, along water courses or in areas subject to flooding, extreme high tides and the rising sea level. Prohibited Uses: d. No person shall construct a new residential dwelling unit, or use a houseboat or barge designed or used as a dwelling unit in the Conservancy District. (5/9/16 ATM); e. No person shall construct any new building (except as allowed with a marina or boatyard under Section IV.A.3.b of this Bylaw) in a VE Zone, as defined on the Flood Insurance Rate Maps, prepared by the National Flood Insurance Program for the Town of Chatham, dated July 16, 2014. (5/9/16 ATM). Area a. The Coastal Conservancy Districts shall consist of all the submerged lands along the coast of Town, and areas subject to flooding including: 1. Areas delineated as the 100-year flood plain (Zones A, AE, AO, VE) on the Flood Insurance Rate Maps, prepared by the National Flood Insurance Program for the Town of Chatham dated July 16, 2014. (5/9/16 ATM) 2. When a coastal bank exceeds the elevation of the relevant one hundred (100) year floodplain, the Coastal Conservancy District boundary shall be the top of the bank.
Prohibition of expansion of existing structures or increase in impervious surface in VE zone	Coastal Flooding	Sea Level Rise, Precipitation and Stormwater, Storm Surge	Retreat	Chatham	MA	Regulatory	Zoning	Floodplain District: 5. Prohibited Uses- The following uses and activities are prohibited in the VE Zone. a. Addition, alteration or reconstruction of an existing structure that results in an increase in building footprint. b. Repair of a substantially damaged existing structure which results in an increase in building footprint. c. Any increase in impervious surface on a residential lot. This may include, but is not limited to, swimming pools, tennis/basketball courts and retaining walls. For functionally dependent projects allowed in the VE Zone, impervious surfaces accessory to the use are allowed provided a Massachusetts registered civil engineer certifies in writing that...

Summary Notes

Strategy Matrix

•The strategies in the spreadsheet are organized based on categories, including policy, land use, mitigation projects, and funding. Listed here under each category are example strategies that Wells might want to consider. These strategies were identified based on conversations with town staff as well as the results of the project's assessment.

RESILIENCE STRATEGIES

Policy	Land Use	Mitigation Projects	Funding
<ul style="list-style-type: none">✓ Establish municipal committee to address coastal issues✓ Incorporate coastal resilience criteria in CIP✓ Address sea level rise in the Comprehensive Plan update	<ul style="list-style-type: none">✓ Freeboard for structures through floodplain management ordinance; include sea level rise areas✓ Coastal resilience overlay zoning district✓ Include sea level rise impact areas in shoreland zone	<ul style="list-style-type: none">✓ Strategically conserve floodable open space✓ Improve stormwater management infrastructure✓ Retrofit impacted structures using floodproofing measures	<ul style="list-style-type: none">✓ Pursue external grant opportunities✓ Establish a municipal resilience fund✓ Continue partnering with surrounding towns and organizations to leverage funds

Summary Notes

Resilience Strategies columns

• The strategies in the spreadsheet are organized based on categories, including policy, land use, mitigation projects, and funding. Listed here under each category are example strategies that Wells might want to consider. These strategies were identified based on conversations with town staff as well as the results of the project's assessment.

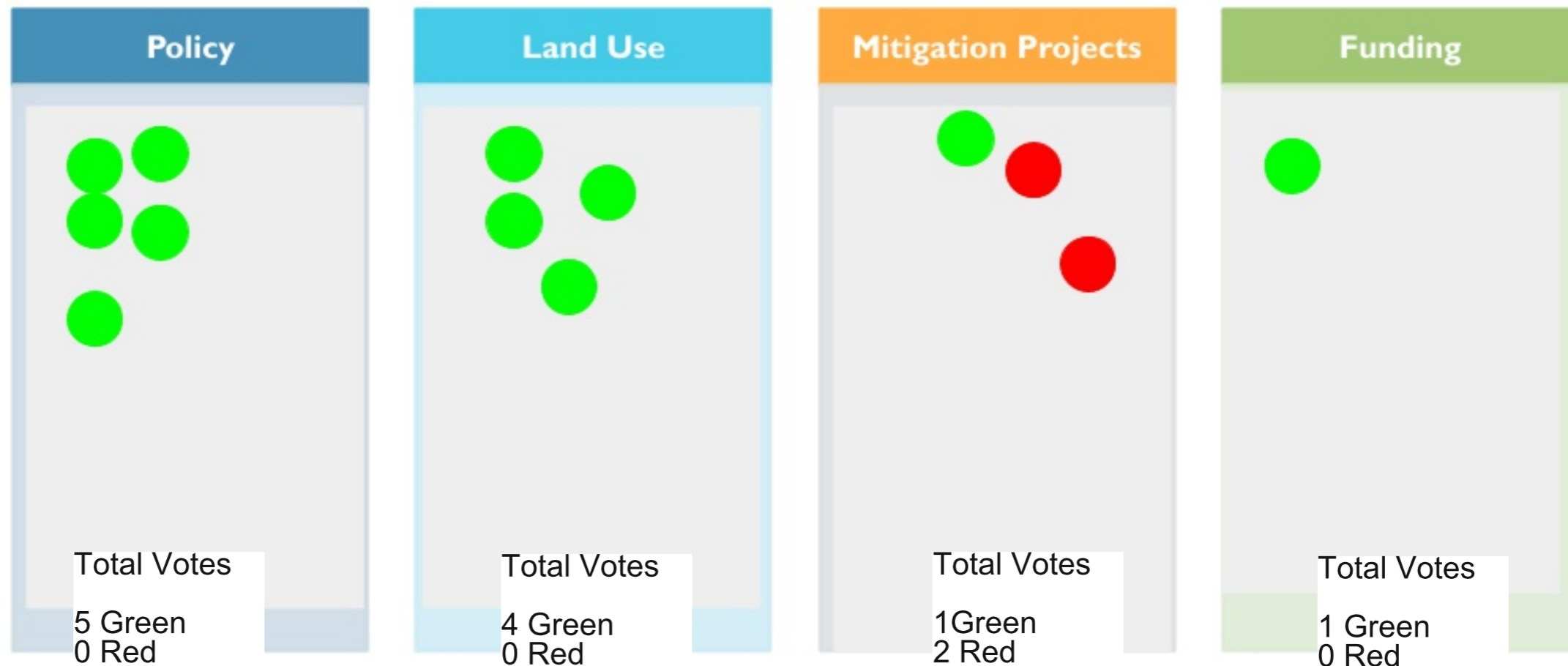


ENGAGEMENT ACTIVITY: RESILIENCE STRATEGIES

Engagement Summary

As an exercise to get the municipal perspective on where to begin focusing resilience work, participants were given 2 green and 1 red dot and asked to place them in strategy categories that they felt Wells should focus its work. A red dot could be placed if they felt a strategy should not be a focus for Wells. Using all dots was optional.

Directions: Each participants gets 2 green dots and 1 red dot. Place green dots in strategy categories where Wells should focus its work. Place a red dot if a strategy should not be a focus for Wells. You do not need to use all your dots.



Share your thoughts on specific strategies: what will work in Wells? Won't work? What would need to happen for them to work? What would you like to see?

Policy	Land Use	Mitigation Projects	Funding	Other--what's else?

Engagement Summary
 Participants were asked to share their thoughts on specific strategies presented. The following comments were typed by participants into the slide.

Policy

- Creation of a sustainability committee to focus on issue

Land Use

- Buyouts?

Mitigation Projects

- Improvements to storm infrastructure
- Investment in land in flood zones

Funding

- New infrastructure bill
- Plans to accommodate water

Other

- Address impact on roads and bridges

Community Engagement Strategies

Share ideas about who to engage and how--be specific.

Example: share project information with property owners thru tax bill. Ask them to visit a website to vote on adaptation strategies.		

Summary Notes

Participants were asked to share ideas by typing directly into the above slide about the best way to engage their community members.

Community Engagement Ideas

- Visual approaches - artists or students putting future water heights on telephone poles to get the public's attention and start conversations
- "Where to put the new town center?" charette

Participant Comment

Larissa: Thank you to the members of volunteer boards that have shared more of their time tonight, the representation from the number of boards here is inspiring. I'm always amazed at people's willingness to give us their time on their evenings. This is going to be a major piece of the Comprehensive Plan Update. The impacts of coastal flooding cannot be ignored as we're looking forward 10 years. Looking at infrastructure investments, not just in the \$4.5M we bonded last year, a lot of which is to handle sea walls, we also need to look at stormwater infrastructure, doing an actual assessment of what our actual stormwater drainage system looks like. We have no idea what is underneath the roads. Know that these are topics you are going to be hearing from us about again and again over the next few years.

How vulnerable are Kennebunk, Wells and York to sea level rise?

Shawn P. Sullivan | Portsmouth Herald

Published 5:54 a.m. ET Feb. 11, 2021 | Updated 1:59 p.m. ET Feb. 11, 2021

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Damage to the seawall on Gooch's Beach in Kennebunk, Maine, is seen after a nor'easter battered the coast in early March 2018. Jonathan Bryant

KENNEBUNK, Maine – Selectperson Edward Karytko on Tuesday mentioned some recorded footage he had seen that showed large waves crashing on the town's shores during the snow storm earlier this month.

"If we get a direct hit from a hurricane, it's probably going to be 10 times as worse," he said.

Karytko made his remark during the Kennebunk Select Board's discussion on rising sea levels as a result of climate change, the impacts that could have on the community, and what the town is doing to take action.

To that end, Community Development Director Chris Osterrieder updated the board on the Tides, Taxes and New Tactics Project, an ongoing effort led by the Southern Maine Planning and Development Commission in collaboration with the towns of Kennebunk, Wells and York.

More: Kennebunk Select Board awards bid for improving Beach Avenue shoreline

The project is focusing on the impacts rising sea levels will have on these coastal communities, as well as on local vulnerabilities and strategies for protecting people, property and natural resources from the impacts of coastal flooding.

Osterrieder said the project's analysis of Kennebunk is finished, so now is the time for the town to begin to understand what the analysis means and discuss strategies for the future.

March 2018 Nor'easter: FEMA surveys storm damage in Kennebunk

The town will hold a virtual workshop on Tuesday, March 2, to share the local assessment results with municipal staff. The workshop is expected to start at 6:30 p.m. and last about one hour, Osterrieder said.

"This step here is really important," he added.

Osterrieder said that the project team has determined a sea level rise of about 3.9 feet over time would affect at least 700 properties on the Kennebunk coast.

Regional Next Steps

Regional Resilience and Sustainability Program
 Kennebunk is one of six southern Maine communities in the Regional Resilience and Sustainability Program to help the towns address climate change impacts and advance sustainability and resilience efforts. Projects include municipal solar contracts to reduce municipal energy costs and emissions; Peer to peer learning on municipal fleet electrification.

Resources:

[Getting There From Here: A Baseline for Advancing Climate Action in Southern Maine Regional Sustainability and Coastal Resilience Assessment](#)

Timeline: 2019-Ongoing

Funders: Towns of Kennebunk, York, Wells

REGIONAL SUSTAINABILITY AND RESILIENCE PROGRAM – Southern Maine Planning and Development Commission
 January 2021
MEMBER TOWNS
 Kennebunk
 Kennebunkport
 Kittery
 Ogunquit
 Wells
 York

GETTING THERE FROM HERE:
 A BASELINE FOR ADVANCING CLIMATE ACTION IN SOUTHERN MAINE
 Regional Sustainability and Coastal Resilience Assessment
 SMPDC

Southern Maine Regional Coastal Resilience Plan

Kennebunk is one of ten municipalities in York and Cumberland counties to collaborate with land trusts, regional conservation organizations and state natural resource agencies to better prepare for impacts of storms and sea level rise. Projected outcomes: assessing resilience needs and socio-economic conditions; assessing coastal impacts and vulnerabilities; creating a working group; identifying and prioritizing resilience strategies and projects; and developing the plan.

Timeline: April 2021-2023

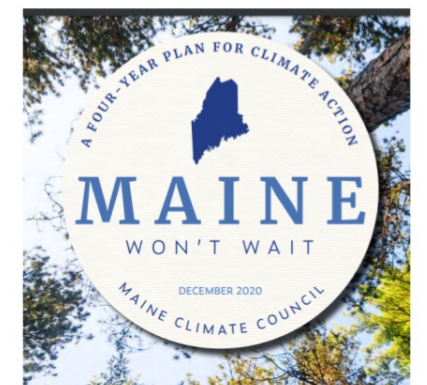
Funders: National Fish and Wildlife Federation, National Oceanic and Atmospheric Administration
 Partners: Towns of Biddeford, Saco, Kennebunk, Kennebunkport, Old Orchard Beach, Scarborough, Kittery, York, Ogunquit, and Wells; SMPDC; Wells Reserve

Maine's Next Steps

On June 26, 2019, the Governor and Legislature created the Maine Climate Council, an assembly of scientists, industry leaders, bipartisan local and state officials, and engaged citizens to develop a four-year plan to put Maine on a trajectory to reduce emissions by 45% by 2030 and at least 80% by 2050. By Executive Order of Gov. Mills, the state must also achieve carbon neutrality by 2045.

Resources

[Maine Won't Wait: A Four Year Plan for Climate Action Scientific Assessment of Climate Change and Its Effects in Maine](#)



Team Notes: Next Steps and Resources

Climate change is one of the most pressing issues of our time and planning for it is a tremendous challenge for municipalities on the front lines. Read more about how Wells and the region is planning for climate action.

Local Next Steps

Tides, Taxes, and New Tactics Project

Kennebunk, York and Wells are all participating in the project and have had a vulnerability assessment and socio-economic analysis completed. The project team will provide assistance to the Towns to incorporate the project findings into municipal planning efforts. The community engagement team will meet with the town committee working on climate adaptation and mitigation planning to discuss feedback from participants in this workshop and possible next steps to engage community members. Project findings will be summarized and compiled in a regional report to outline results of the vulnerability assessment and economic analysis, town specific findings, and recommendations for advancing coastal resilience planning.

Resources:

[Project Summary: Wells](#)

[Vulnerability Assessment Towns of York, Wells, and Kennebunk, Maine](#) (GEI Consulting)

[Economic Analysis of Sea Level Rise: Kennebunk, York, and Wells](#) (rbouvier consulting)

Timeline: April 2020-June 2021

Funder: Maine Coastal Communities Grant Program

Partners: Towns of Kennebunk, York, Wells; GEI Consulting; rbouvier consulting; SMPDC;

Wells Reserve; Maine Sea Grant