DURHAM GROUNDWATER RISE VULNERABILITY & PLANNING STUDY

PARTNERS:

STRAFFORD Regional Planning Commission

JFK Environmental Services LLC

NH

NHDES

CAW New Hampshire Coastal Adaptation Workgroup

RESOURCEFUL · READY · RESILIENT

Kyle Pimental

Principal Regional Planner

This project was funded through the Clean Water State Revolving Fund (CWSRF) Loan Program administered by the State of New Hampshire Department of Environmental Services.

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THIS LOOKS FAMILIAR...

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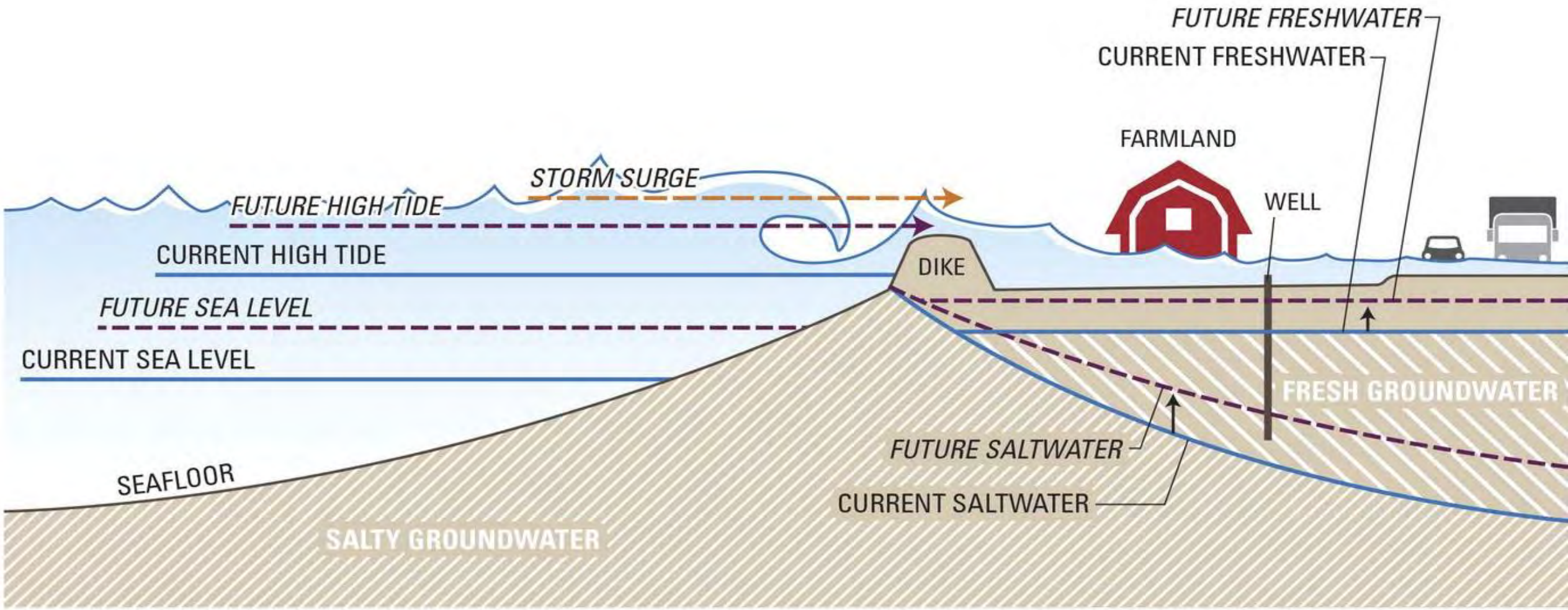
...THIS IS MORE COMPLICATED.



NOTE: Sea, tide, and storm surge levels, depth of groundwater, and location of saltwater lens are for illustrative purposes only and do not depict actual or projected levels.

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PROJECT PROCESS

To determine the susceptibility of:

- Public and Private Drinking Water Supplies
- Private Septic Systems
- Contaminated Sites
- Stormwater Infrastructure
- Utilities
- Roads
- Other Critical Municipal Assets

in low-lying areas to groundwater rise and saltwater intrusion

MODELING → MAPPING → ASSESSMENT → RECOMMENTATIONS

Incorporated the most recent sea level rise data…

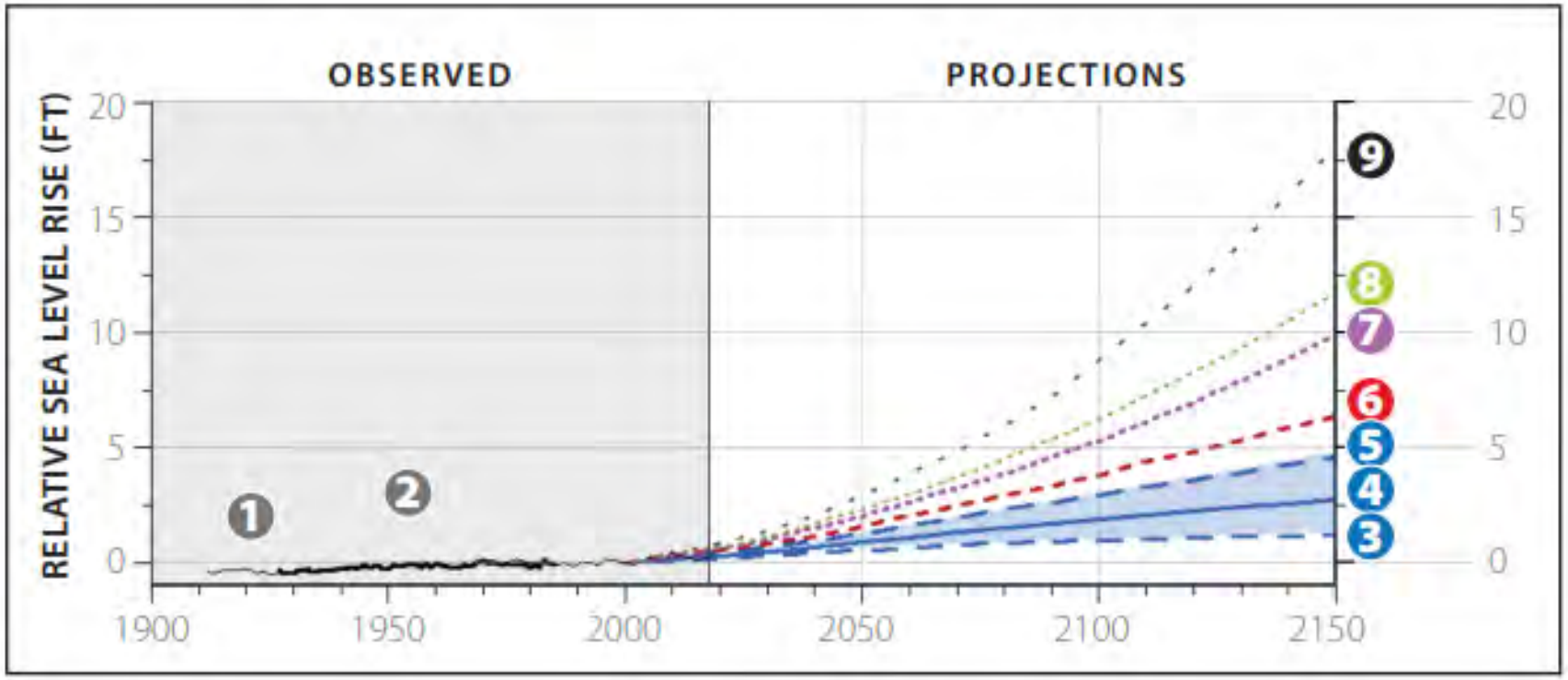
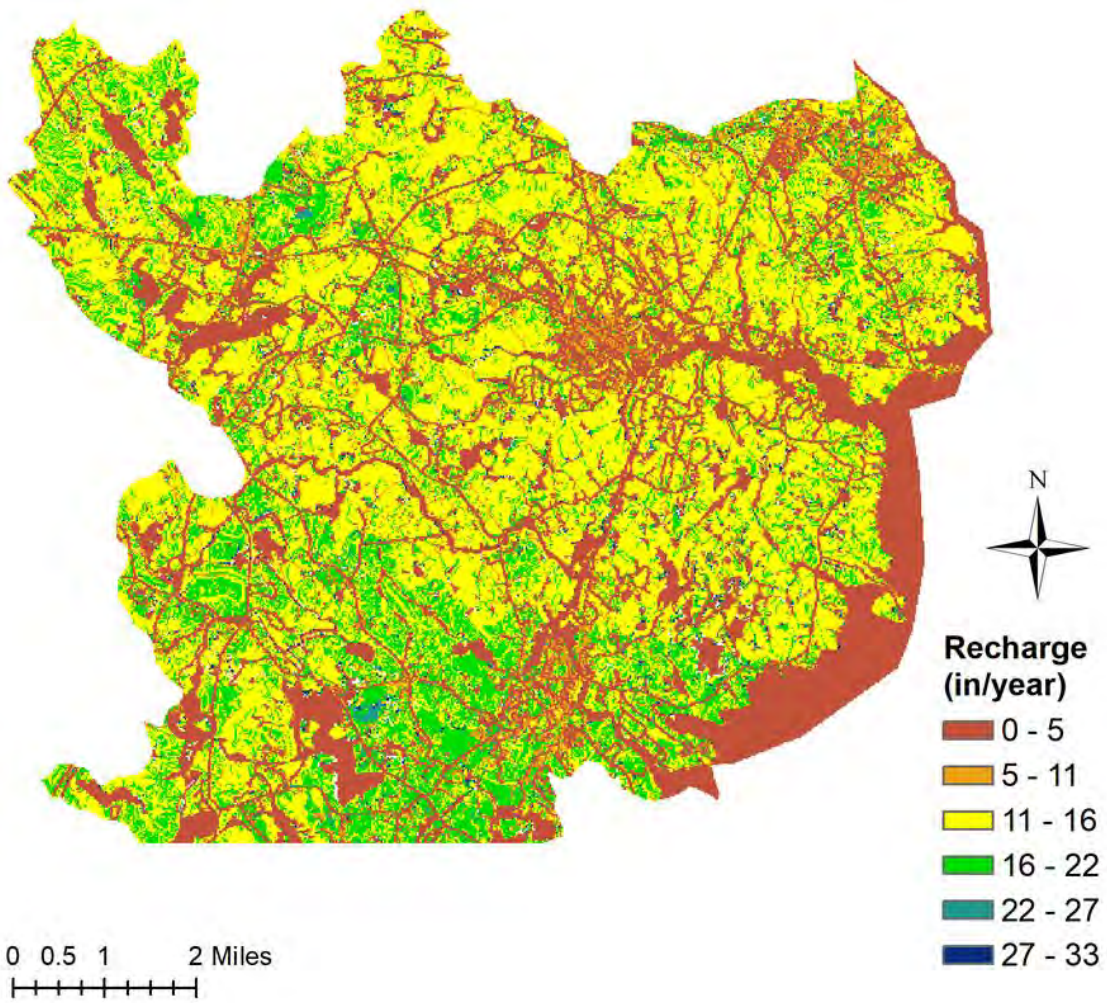
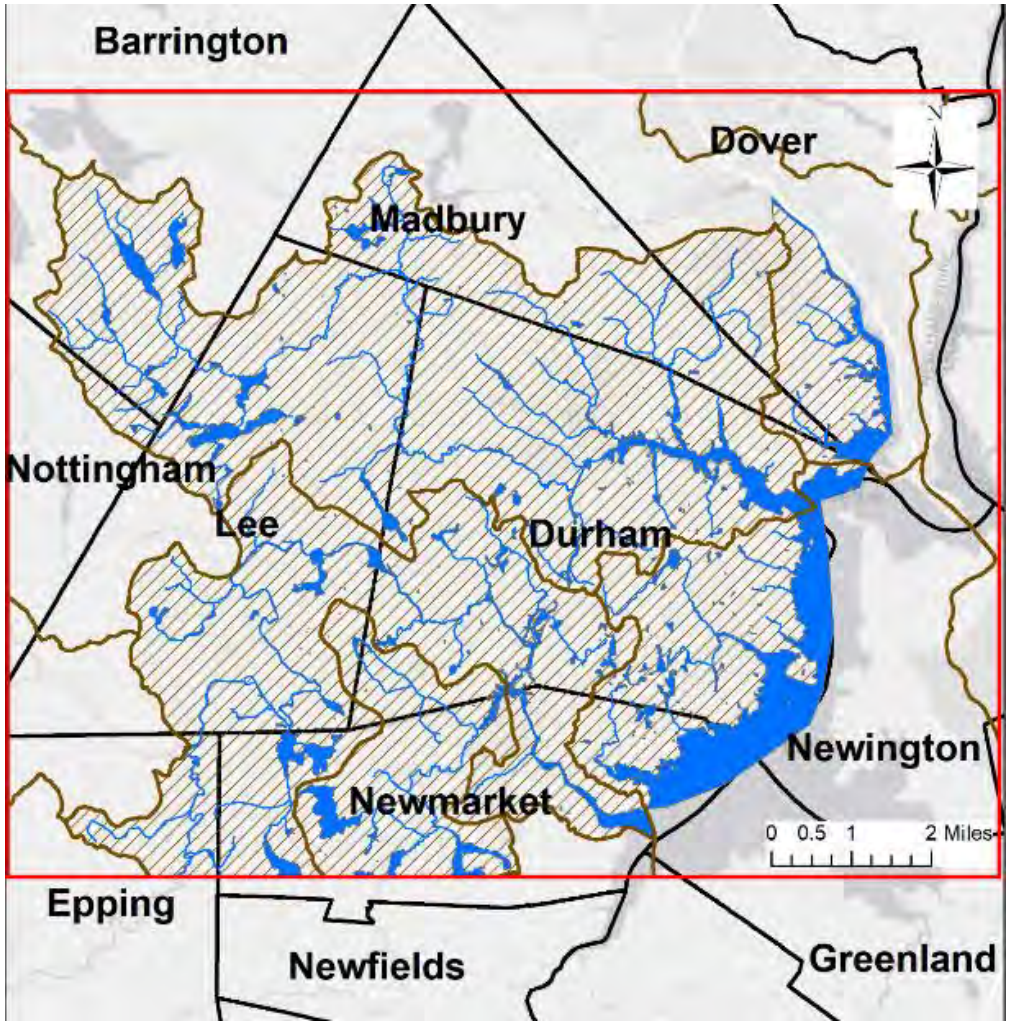


Table 1: Projected local sea level rise (in feet) estimates above 2000 levels

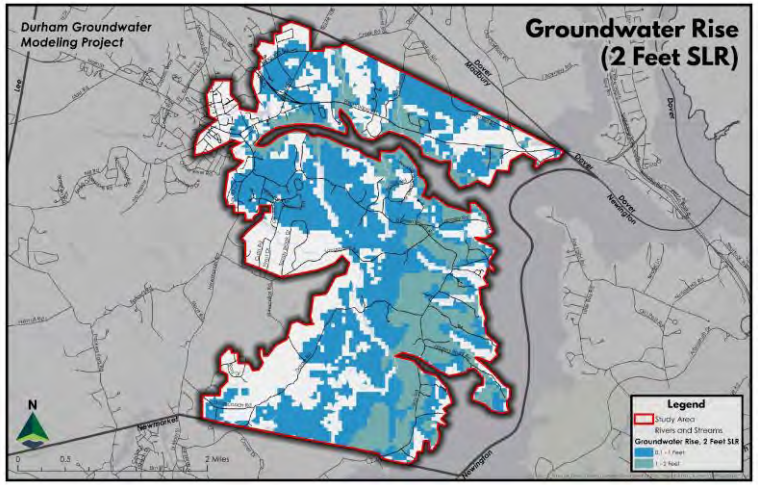
Year	Curve #5	Curve #7
	Likely Range	1-100 Chance
	67% probability SLR is between:	1% probability SLR meets or exceeds:
2050	0.5 – 1.3	2.0
2100	1.0 – 2.9	5.3
2150	1.2 – 4.6	9.9

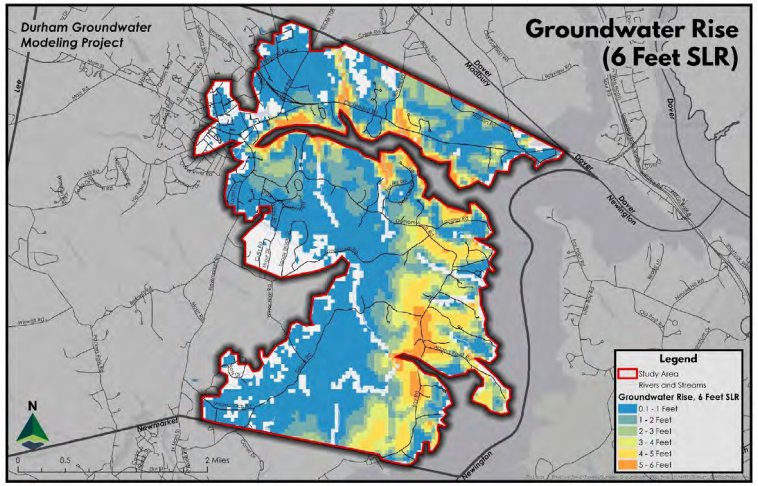
…to build the model.

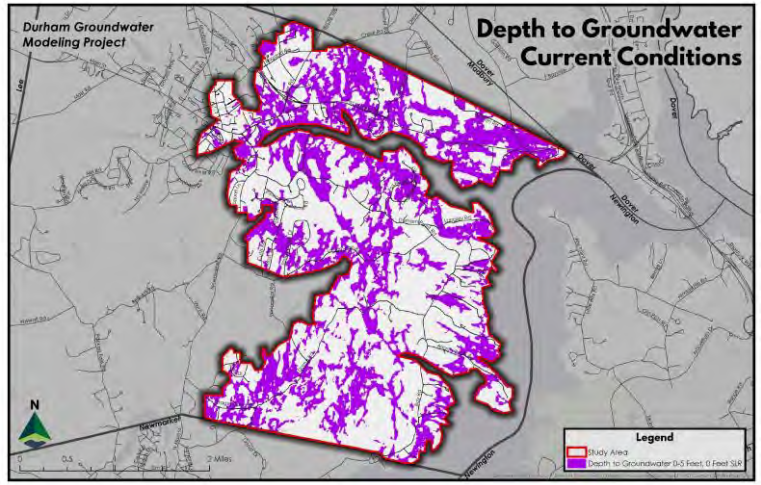


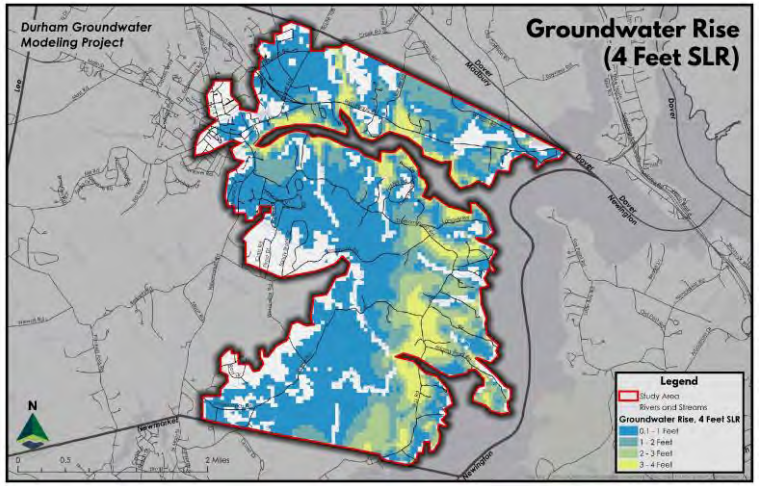


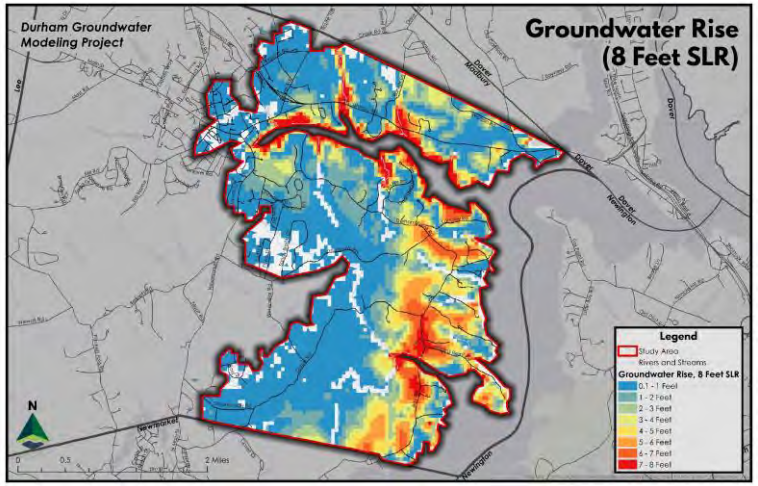
Shapefiles produced from the model runs were used to create a series of maps…

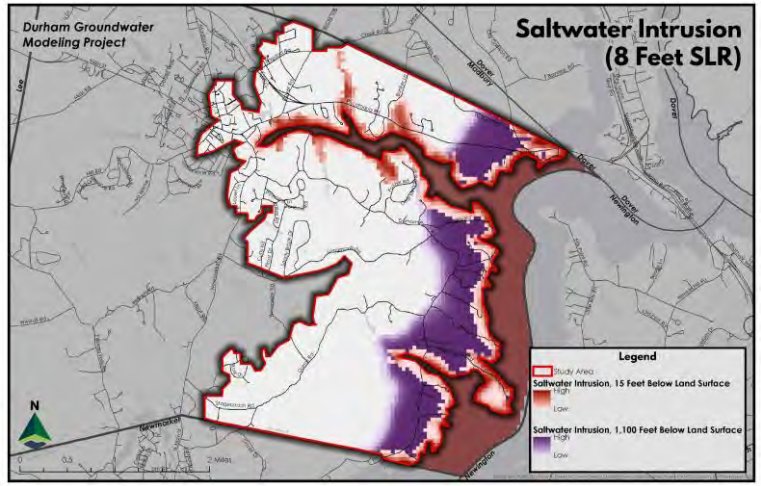




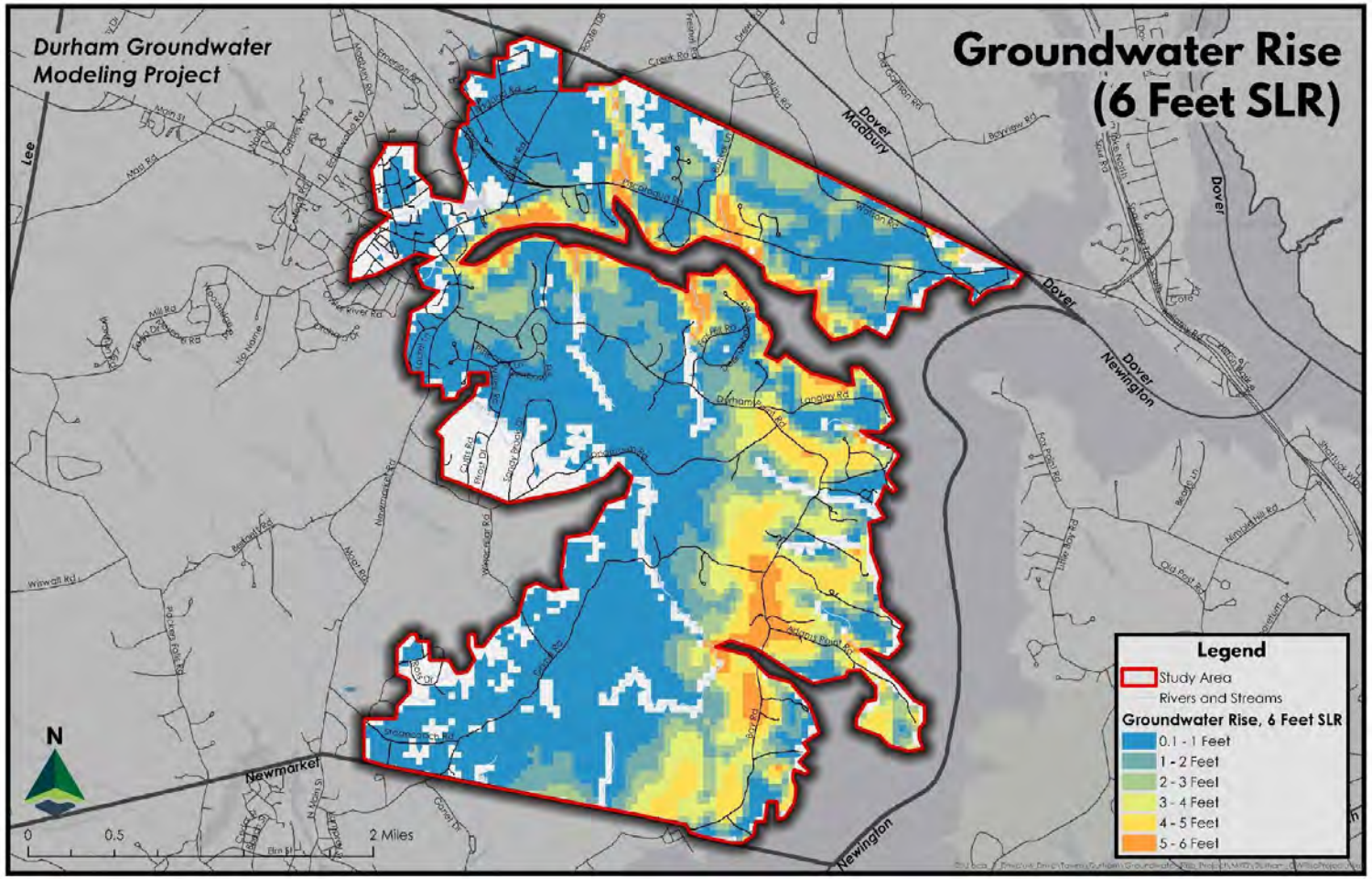


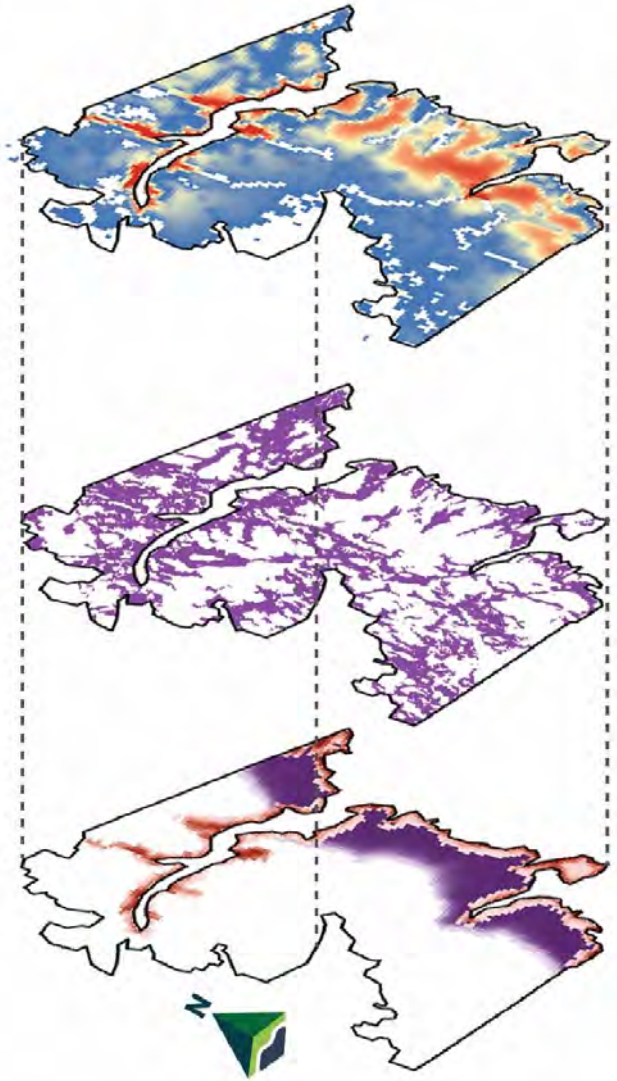






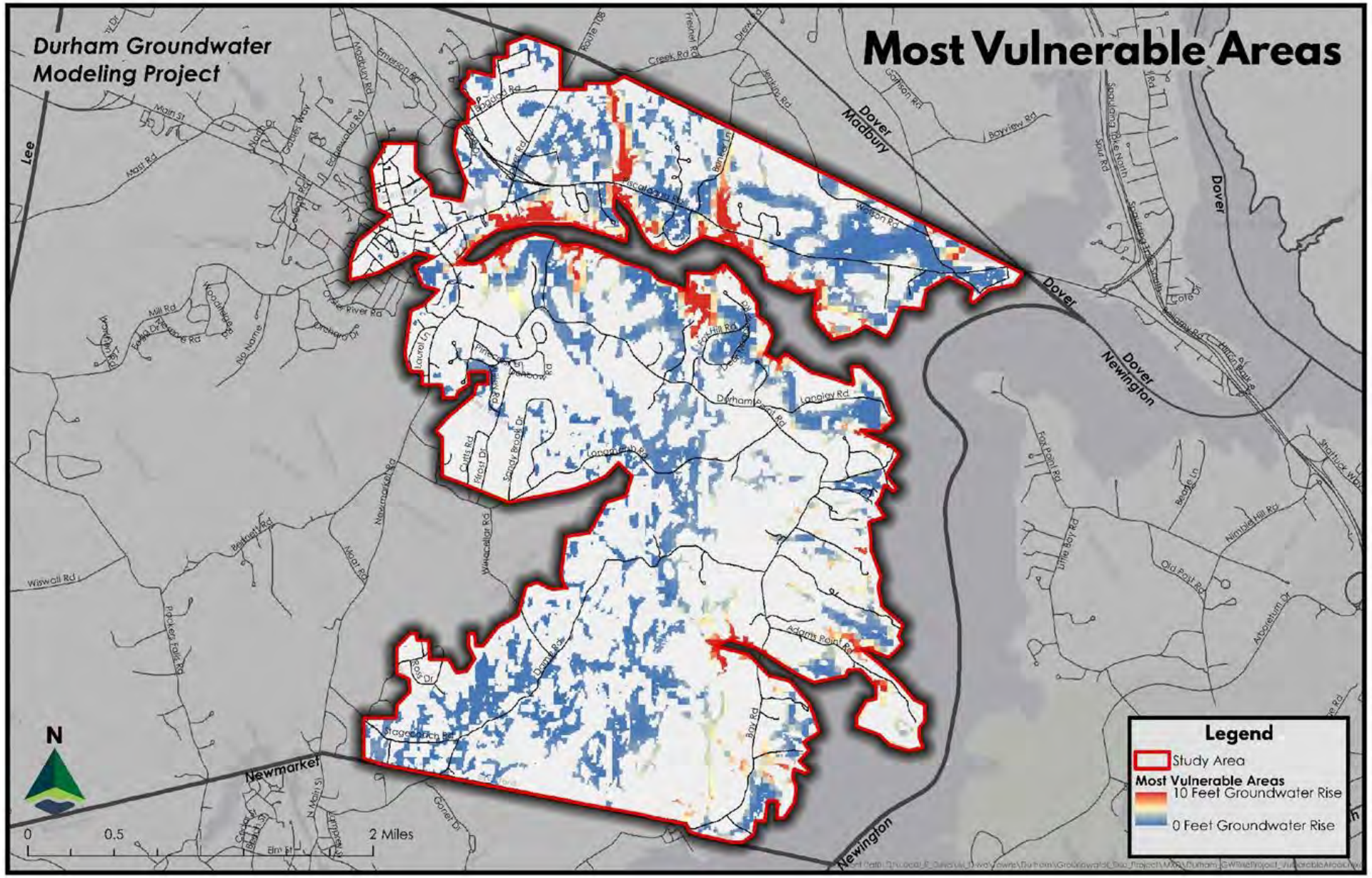
…a GIS mapping analysis was conducted using the maps to overlay existing local infrastructure data.





MODELING
MAPPING
ASSESSMENT
RECOMMENTATIONS

Final map of most vulnerable areas



MAPPING
ASSESSMENT
RECOMMENDATIONS
MODELING

Assessment was conducted to compile results – Point data

Category	Assets and Resources (*Point Data*)	# of Assets Impacted by Groundwater Rise*
Stormwater Infrastructure	Best Management Practices (BMPs)	1
	Catch Basins	71
	Culverts	92
	Drainage Manholes	2
	Outfalls	14
Municipal Critical Facilities	Emergency Response Facilities	1
	Non-Emergency Response Facilities	1
	Potential Resources	4
	Water Resources	7
Private Infrastructure	Private Wells	110
	Septic Systems	110
Contaminated Sites	Leaking Underground Storage Tanks	2
	Underground Injection Control	1
	Non-Hazardous, Non-Sanitary Holding Tank	1
*Assuming 6 feet of sea level rise w/ depth to groundwater less than 5 feet		

Assessment was conducted to compile results – Line data

Category	Assets and Resources (*Line Data*)	Length of Assets Impacted by Groundwater Rise*
Stormwater Infrastructure	Stormwater Pipes	1,030 feet
	Swales	4,637 feet
Municipal Critical Facilities	Roadways	9.8 miles
Other Utility Infrastructure	Sewer Pipes	2.2 miles
	Water Pipes	3.3 miles
*Assuming 6 feet of sea level rise w/ depth to groundwater less than 5 feet		

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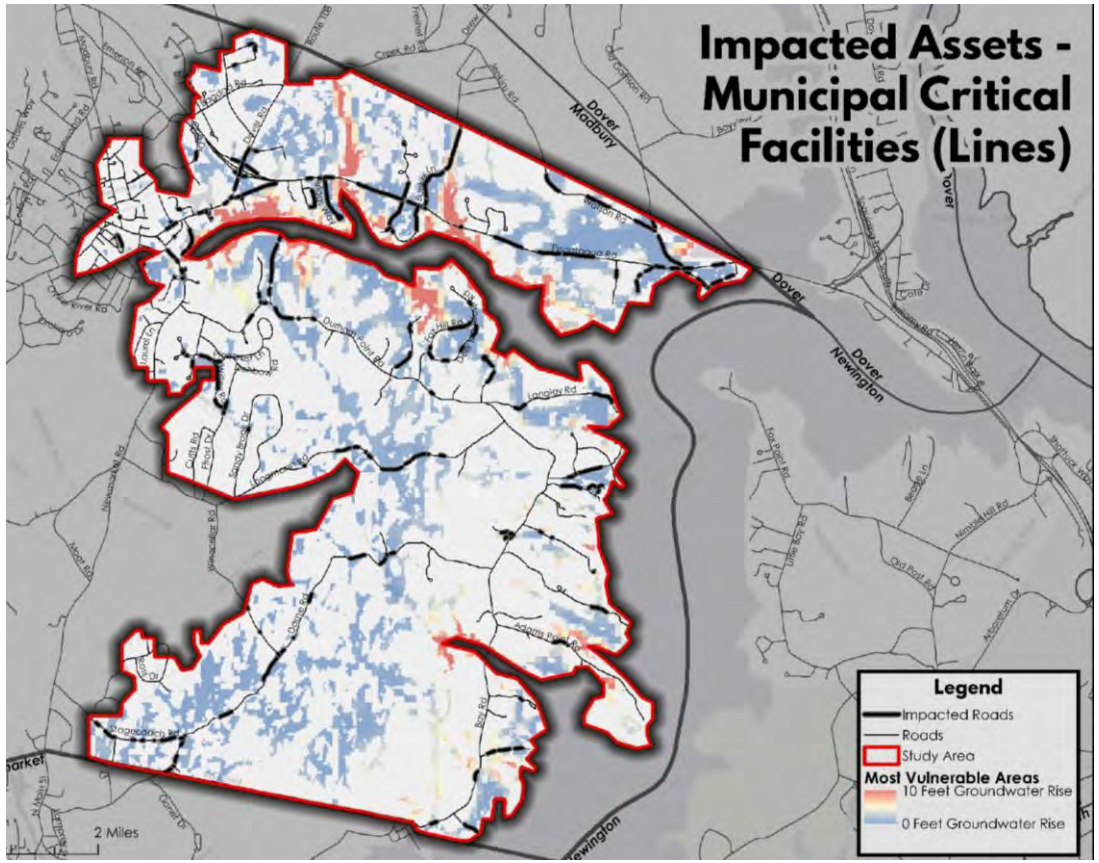
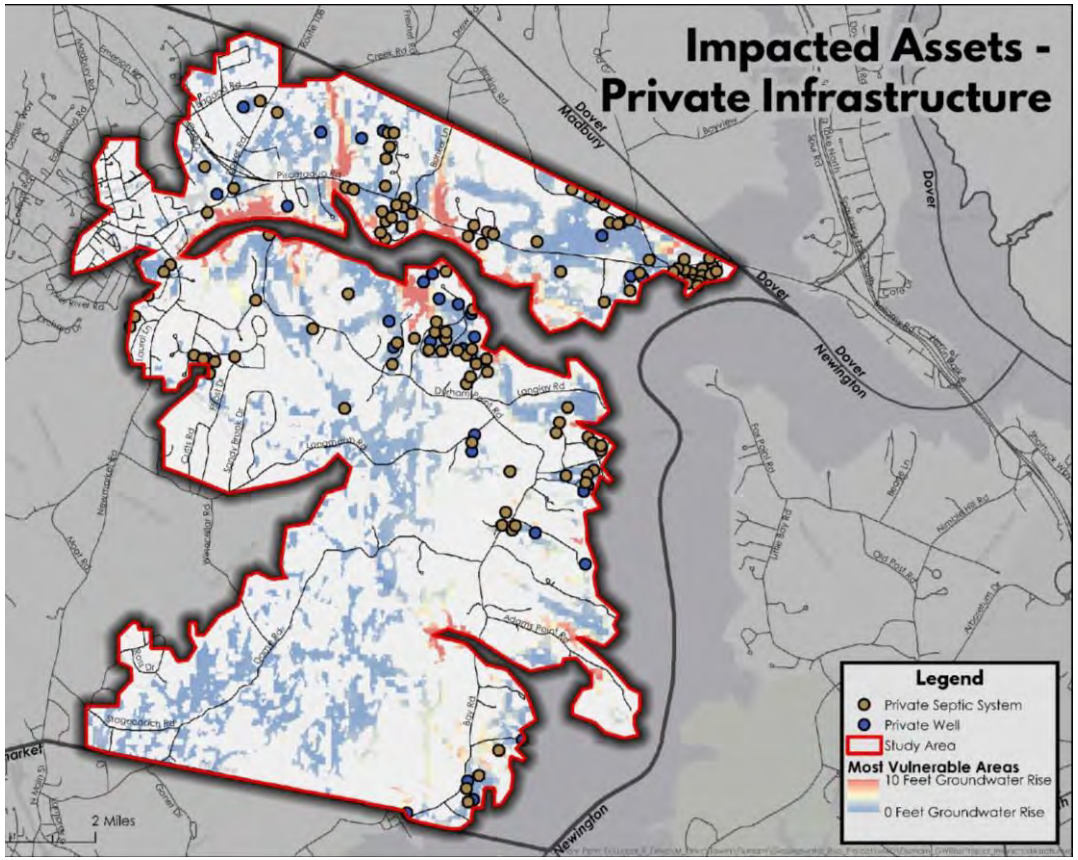
PROJECT HIGHLIGHTS





DATA DEVELOPMENT

STAKEHOLDER ENGAGEMENT

RECOMMENDATION

EVALUATION

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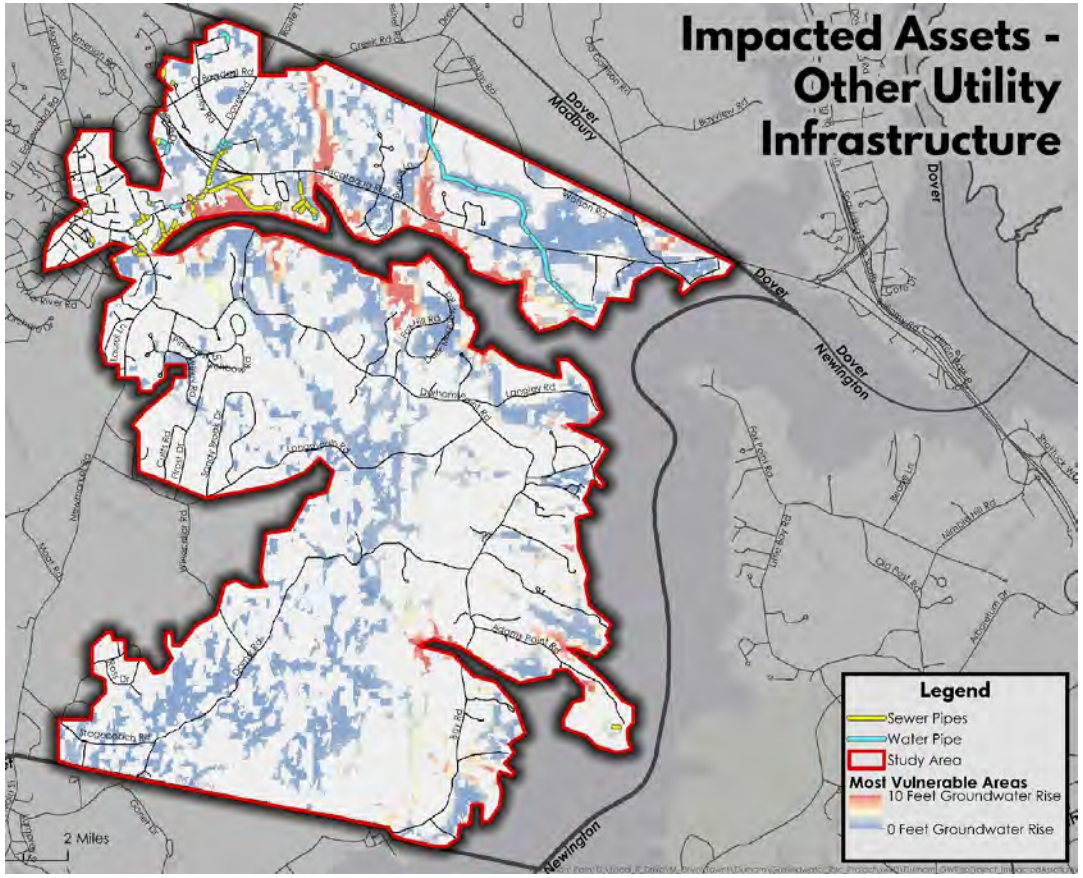
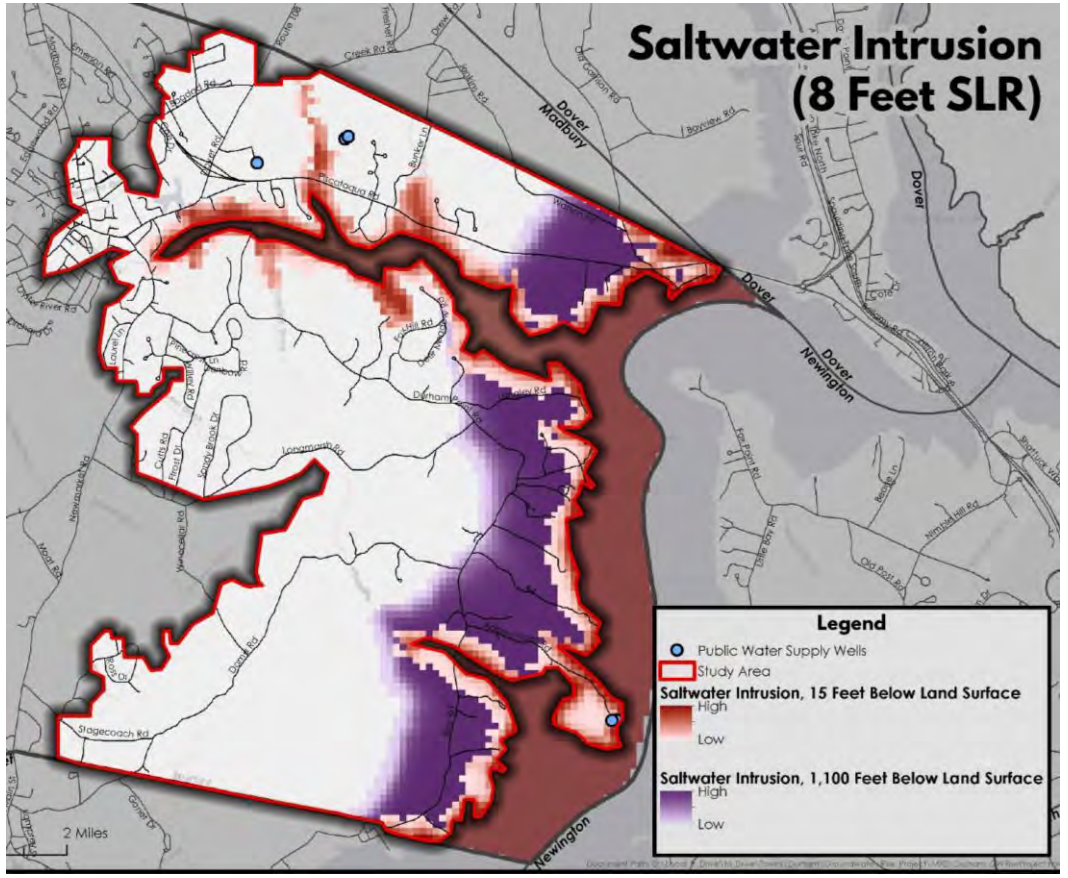
PROJECT HIGHLIGHTS





DATA DEVELOPMENT

STAKEHOLDER ENGAGEMENT

RECOMMENDATION

EVALUATION

Worked with the Town staff to develop goals, recommendations, and potential funding sources

Table 11: Implementation matrix

Action	Category	Responsibility	Timeframe
Goal: Gain a better understanding of the vulnerability of existing identified stormwater assets			
Obtain additional data for existing stormwater infrastructure by applying for a Clean Water State Revolving Fund (CWSRF) stormwater loan to complete an Asset Management Program (AMP) to obtain specific information on vulnerable stormwater assets, including depth data and infrastructure condition, which will assist with managing several requirements of the NH MS4 permit. The CWSRF Asset Management Loan Forgiveness Guidance Document is a useful resource to reference prior to applying. The Town could apply for additional funds through an application of a CWSRF planning loan to fill in data gaps; however, utilizing the AMP may be a more suitable option and should be completed as a first step for infrastructure inventory, condition, and location.	Stormwater Infrastructure	Town Council, Town Administrator, and Public Works Department	Short (1-2 years)
Goal: Create a more resilient stormwater system			
In vulnerable areas, ensure that any stormwater BMPs and/or retrofit provides adequate infiltration from mobilizing contaminants and can be used to maximize groundwater recharge.	Stormwater Infrastructure	Public Works Department	Medium (2-5 years)
Consider including the impacts from groundwater rise when updating the Town's infiltration and inflow (I&I) maintenance and survey practices.	Stormwater Infrastructure	Public Works Department	Short (1-2 years)
Review drainage manuals from places in the country that are currently experiencing and planning for groundwater rise (i.e., Florida-Dade County) for suggestions on more resilient stormwater construction materials and innovative retrofit techniques. This may include things like installing concrete coated asphalt storm drains, slip-lining, and anti-seep collars.	Stormwater Infrastructure	Public Works Department	Medium (2-5 years)

THANK YOU!

Kyle Pimental

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