Stonington Flood Vulnerability Study

Maine Beaches Conference

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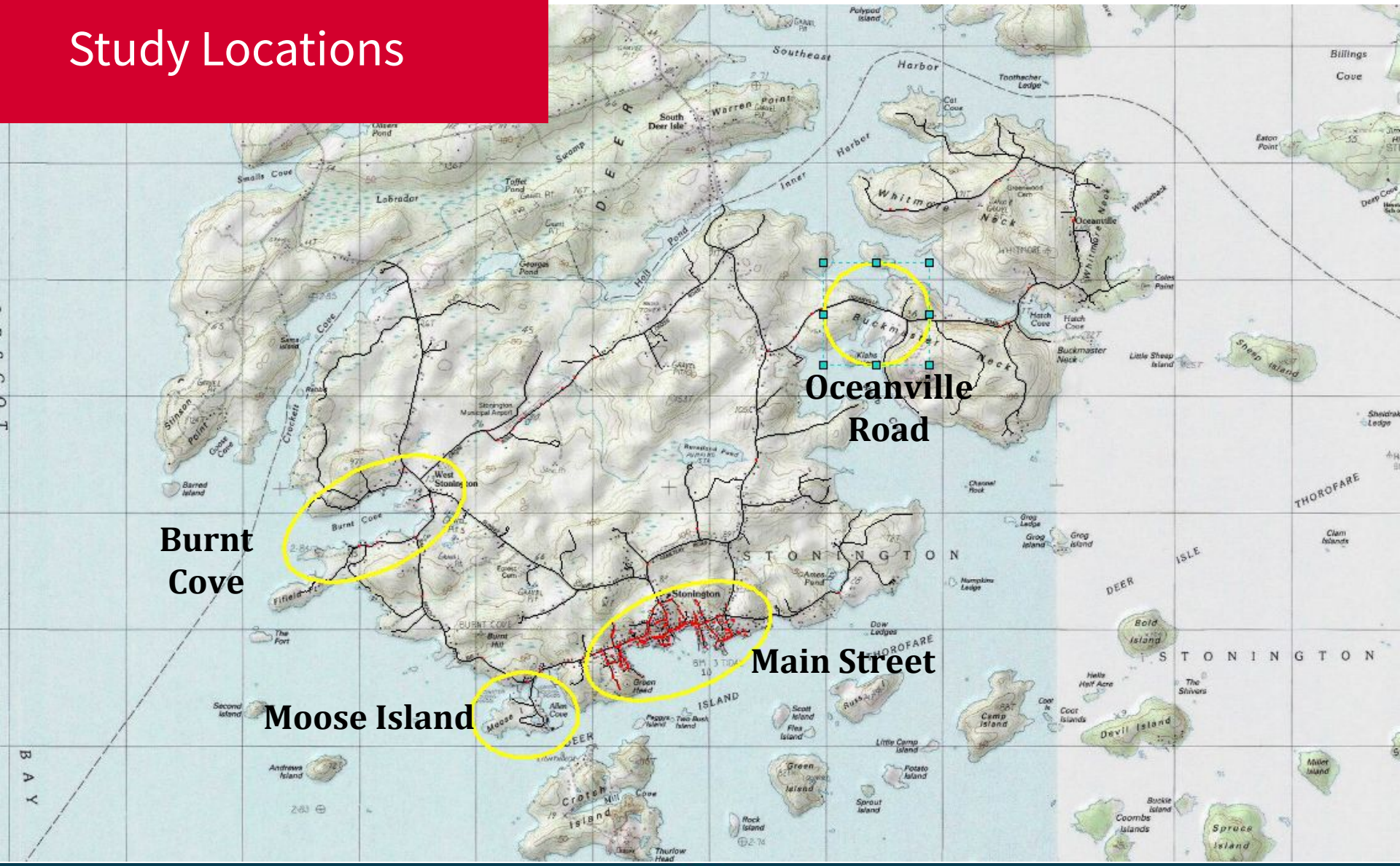
June 14, 2019

Project Goals

1. Identify Vulnerable Town-Owned Infrastructure (Assets) Within the Project Area
   - Roads, Pump Stations, etc.
2. Provide Guidance on When Adaptation Solutions Would Need to Take Effect
   - Near-term (2030), Medium-term (2050), Long-term (2100)
3. Develop Up To Three Adaptation Alternatives For Each Type of Asset Identified

Study Locations



Vulnerability Assessment

What makes something vulnerable?

1. Exposure to flooding
2. Sensitivity to flooding
3. Adaptive capacity

Vulnerability Assessment

1. Exposure to Flooding

I. Coastal Storms
- FEMA Flood Insurance Map Data

II. Sea Level Rise
- NOAA (2017) SLR Projections

Vulnerability Assessment

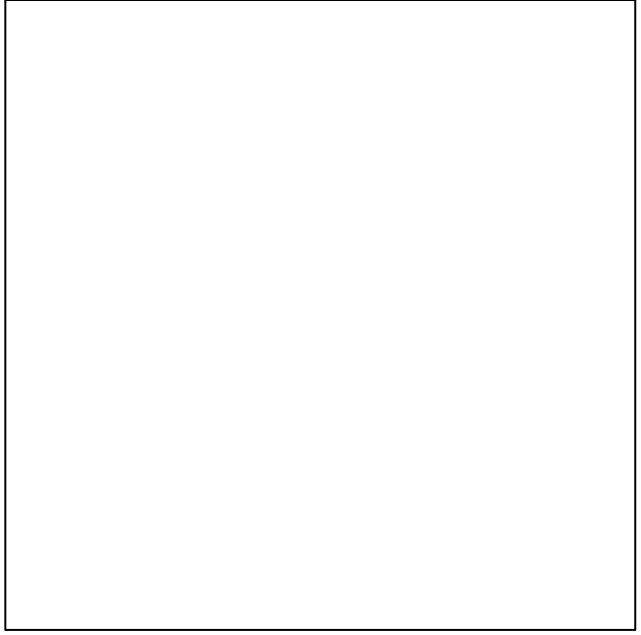
1. Exposure to Flooding

I. Coastal Storms

- FEMA Flood Insurance Map Data

“100-year storms”

Vulnerability Assessment



1. Exposure to Flooding

II. Sea Level Rise

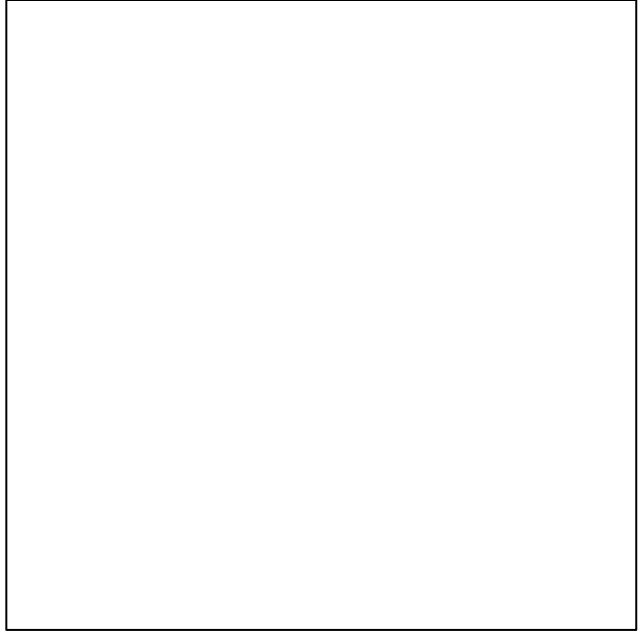
- NOAA (2017) SLR Projections

Vulnerability Assessment

1. Exposure to Flooding

II. Sea Level Rise

- NOAA (2017) SLR Projections

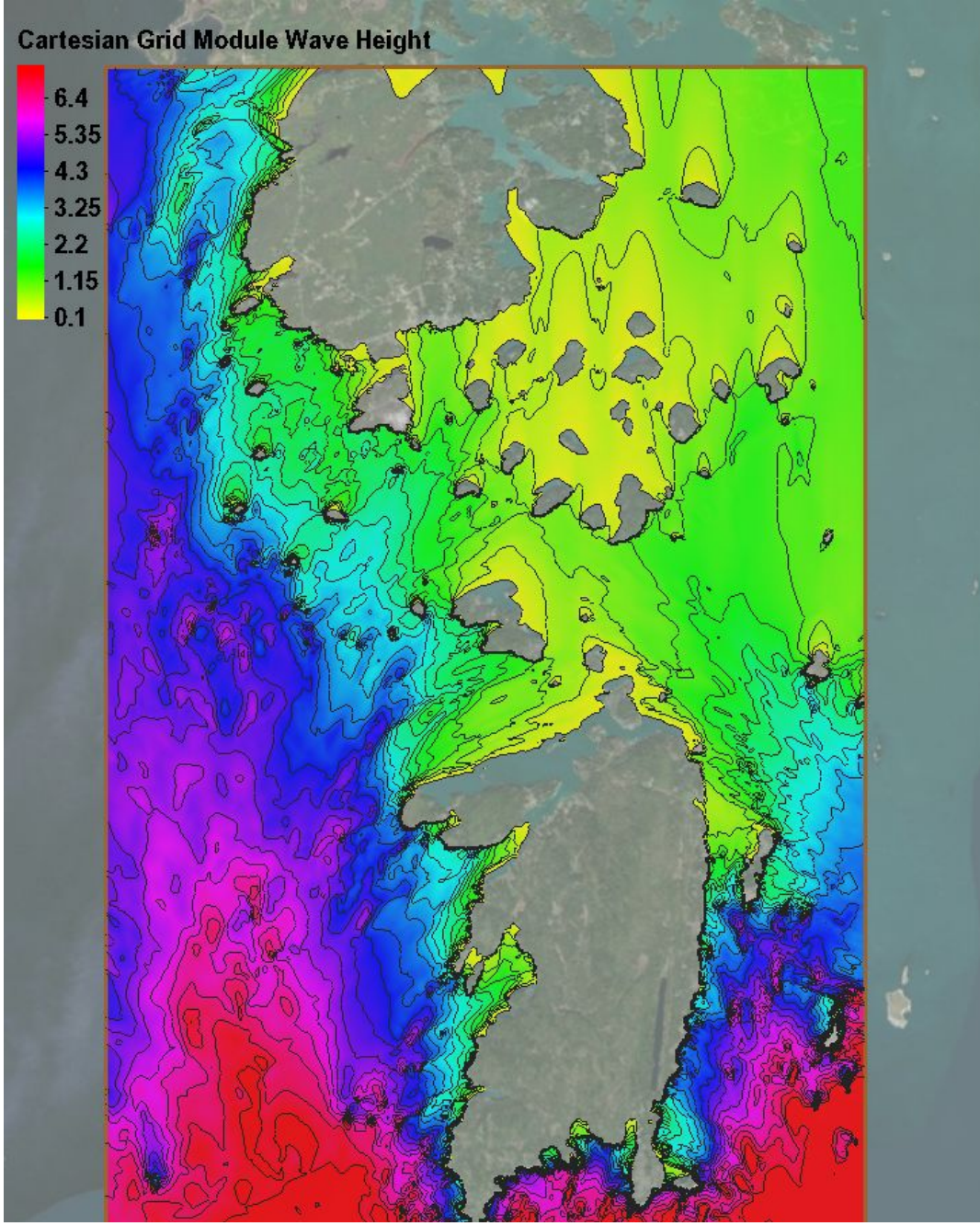


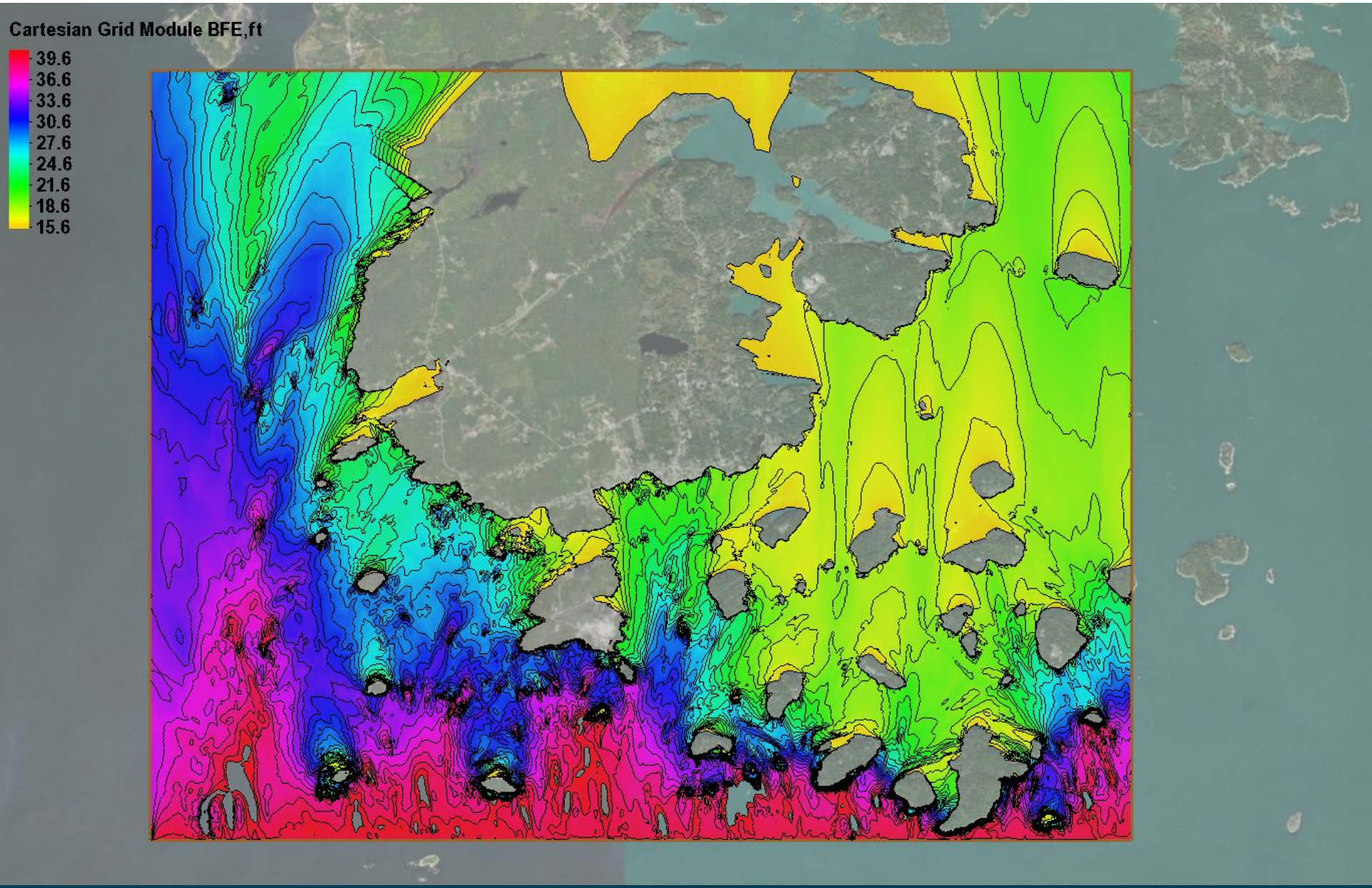
Vulnerability Assessment

STWAVE Modeling

Worst case scenario flood extents:

- Int-High SLR (6.2 ft)
- 100-yr storm




Cartesian Grid Module BFE,ft
39.6
36.6
33.6
30.6
27.6
24.6
21.6
18.6
15.6

Worst Case Scenario Flooding: Year 2100, 6.2 ft SLR, 100-yr Storm

LEGEND:

- Stonington roads
- Inundation boundary 2100 Int-High
- Inundated roads
- Inundation boundary 2030 Int-Low
- Inundated culvert
- Inundated pipe
- Inundated storm drain
- Inundated pump station
- Inundated manhole

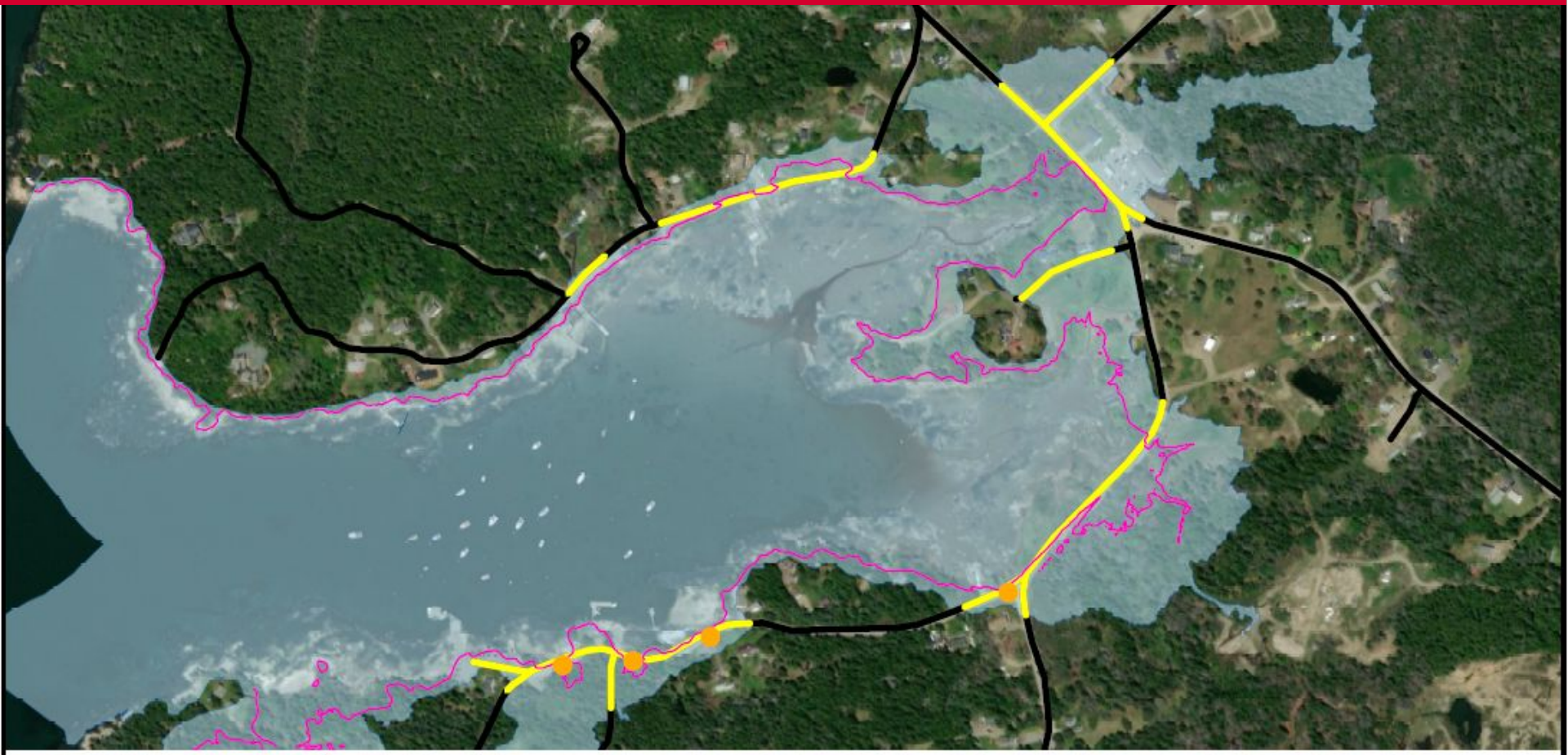
N

0 250 500 1,000

Feet

Stonington Flood Vulnerability Study Stonington, Maine	GEI Consultants	1% ANNUAL CHANCE FLOOD INUNDATION WITH INTERMEDIATE-HIGH SEA LEVEL
Town of Stonington Stonington, Maine	Project 1804859	Fig. 1

Worst Case Scenario Flooding: Year 2100, 6.2 ft SLR, 100-yr Storm



LEGEND:

- Stonington roads
- Inundation boundary 2100 Int-High
- Inundated roads
- Inundation boundary 2030 Int-Low
- Inundated culverts

N W E S

0 250 500 1,000

Feet

Stonington Flood Vulnerability Study Stonington, Maine	GEI Consultants	1% ANNUAL CHANCE FLOOD INUNDATION WITH INTERMEDIATE-HIGH SEA LEVEL
Town of Stonington Stonington, Maine	Project 1804859	Fig. 3

Worst Case Scenario Flooding: Year 2100, 6.2 ft SLR, 100-yr Storm

Worst Case Scenario Flooding: Year 2100, 6.2 ft SLR, 100-yr Storm

Vulnerability Assessment

2. **Sensitivity to Flooding**

How likely is it that an asset will be damaged if it is exposed to flooding?

3. **Adaptive Capacity**

How easy will it be to adapt the asset in the future?

Road Elevation

Pump Station Locations

Adaptation Measures

When will adaptation measures need to be in place?

- Near-Term 2030
- Medium-Term 2050
- Long-Term 2100

Flooding Scenarios – Main Street

Near-Term Medium-Term Long-Term

Elevation Reference (NAVD88, ft)		Existing Water Elevation, ft	SLR Projection								
			2030 Int-Low	2030 Int	2030 Int-High	2050 Int-Low	2050 Int	2050 Int-High	2100 Int-Low	2100 Int	2100 Int-High
			7 inches	10 inches	14 inches	11 inches	19 inches	27 inches	21 inches	48 inches	74 inches
1% Flood Elevation		11.0	13.2	13.5	13.9	13.6	14.3	14.9	14.4	16.7	18.9
SWEL	0.20%	9.9	10.5	10.8	11.1	10.8	11.5	12.2	11.6	13.9	16.1
	1%	9.3	9.9	10.2	10.5	10.2	10.9	11.6	11.0	13.3	15.5
	2%	9.0	9.6	9.9	10.2	9.9	10.6	11.3	10.7	13.0	15.2
	10%	8.4	9.0	9.3	9.6	9.3	10.0	10.7	10.1	12.4	14.6
HAT		6.6	7.2	7.5	7.8	7.5	8.2	8.9	8.3	10.6	12.8
MHHW		5.0	5.6	5.9	6.2	6.0	6.7	7.3	6.8	9.1	11.2
MHW		4.6	5.2	5.5	5.8	5.5	6.2	6.9	6.4	8.7	10.8
NAVD88		0.0	0.6	0.9	1.2	0.9	1.6	2.3	1.7	4.0	6.2
MSL		-0.3	0.3	0.6	0.9	0.6	1.3	2.0	1.4	3.7	5.9
MLW		-5.2	-4.7	-4.4	-4.1	-4.3	-3.6	-3.0	-3.5	-1.2	0.9
MLLW		-5.6	-5.0	-4.7	-4.4	-4.7	-4.0	-3.3	-3.9	-1.6	0.6

Flooding Scenarios – Atlantic Ave

Near-Term Medium-Term Long-Term

Elevation Reference (NAVD88, ft)		Existing Water Elevation, ft	SLR Projection								
			2030 Int-Low	2030 Int	2030 Int-High	2050 Int-Low	2050 Int	2050 Int-High	2100 Int-Low	2100 Int	2100 Int-High
			7	10	14	11	19	27	21	48	74
			inches	inches	inches	inches	inches	inches	inches	inches	inches
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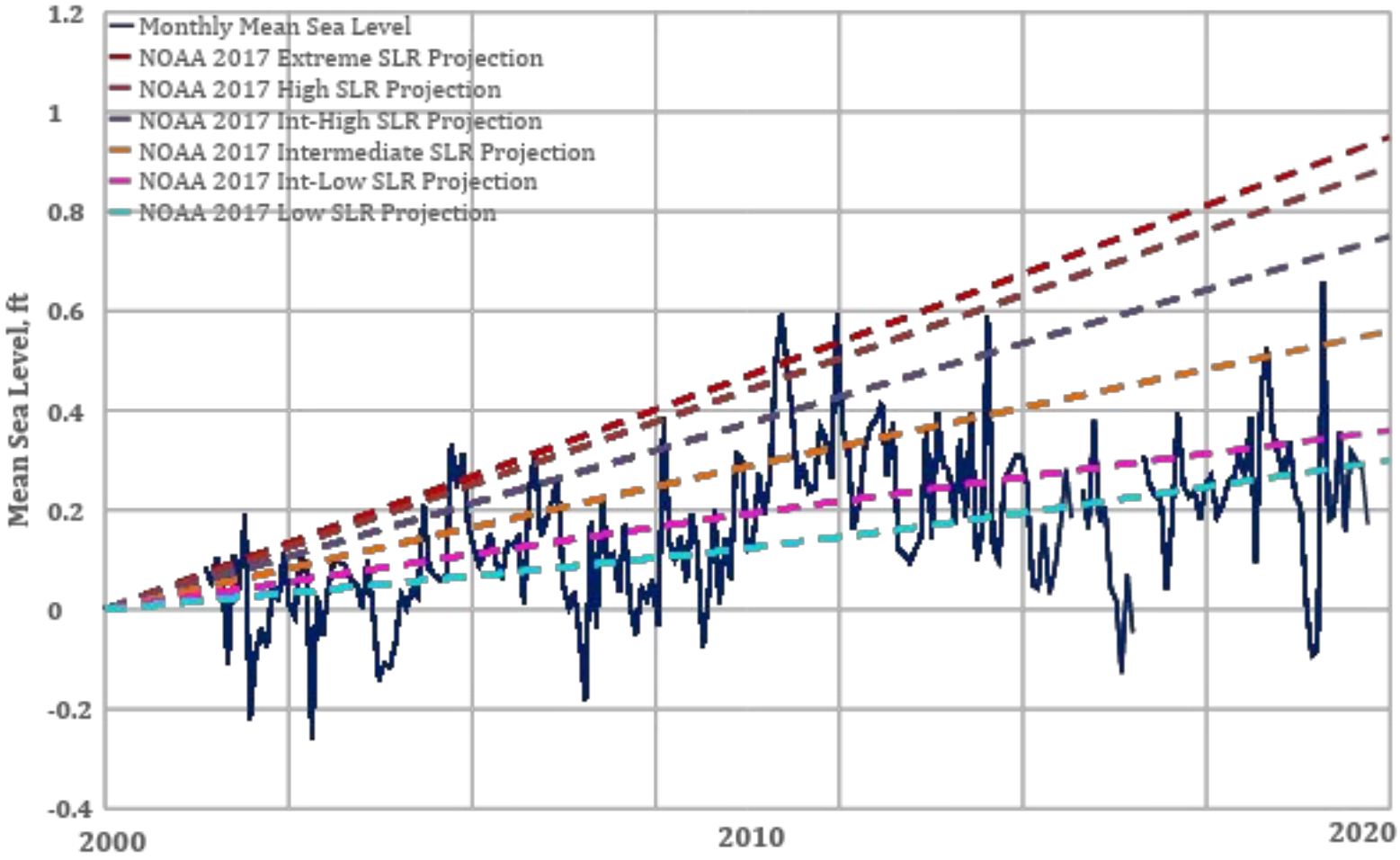
MLLW		-5.6	-5.0	-4.7	-4.4	-4.7	-4.0	-3.3	-3.9	-1.6	0.6

SEA LEVEL RISE OVER THE PAST 20 YEARS, BAR HARBOR NOAA BUOY



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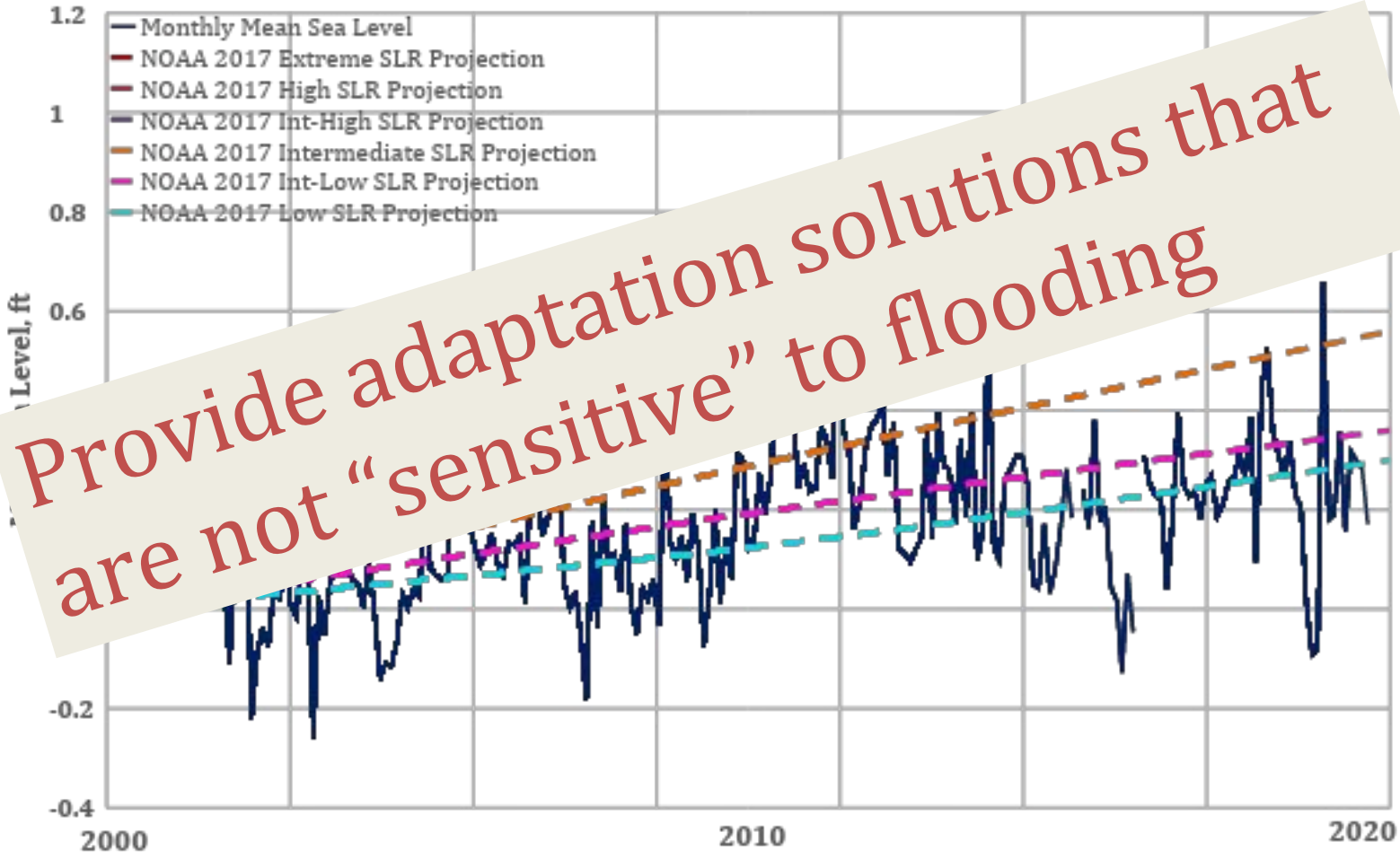

Next Steps

- Complete Vulnerability Study
  - Finalized list of flooding scenarios and assets (specific roads, pump stations, etc.)
  - Interview Asset Managers
  - Public Presentation of Vulnerability Study Results
- Determine Timeline for Adaptation Measures to be Implemented
- Provide Adaptation Measure Options


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