

GEI Consultants

Scarborough Flood Vulnerability Assessment
Kickoff Meeting

May 29th, 2024

Meeting Agenda

Project Meeting Agenda

Project Name: Scarborough Flood Vulnerability Assessment

Date: May 29th, 2024

Time: 10:00 AM

GEI Project Number: 2403961

Invited Participants:

GEI Project Team	Scarborough Project Team	
Leila Pike	Jami Fitch	Todd Souza
Ilan Gasko	Angela Blanchette	Autumn Spear
	Rich Kindelan	April Sither
	Doug Howard	

AGENDA

1. **Welcome and introductions**
2. **Discuss project goals**
3. **Review proposed flood scenarios for vulnerability assessment**
4. **Review assets and GIS data to include in analysis**
5. **Review town ordinances to include in Task 4**
6. **Discuss a draft Community Engagement Plan**
7. **Discuss overall project schedule, including:**
    - Next Deliverables
    - Next Community Event
    - Next Project Meeting
8. **Adjourn**

Project Goals

- Understand broad risk to flood exposure to Town-owned infrastructure, including time horizons when flood inundation may occur
- Provide general flood adaptation strategies with relative costs (e.g., $, $$, $$$), and 3 concept-level plans for potential adaptation sites
- Highlight ordinance sections to be addressed to reduce flood risk
- Conduct community engagement events throughout project
- Convey project methods and results through an ArcGIS StoryMap

Flood Scenarios

Proposed Sea Level Rise and Storm Surge Scenarios:

Sea Level Rise:

- Maine Climate Council "Commit to Manage" and "Prepare to Manage" scenarios

Storm Surge:

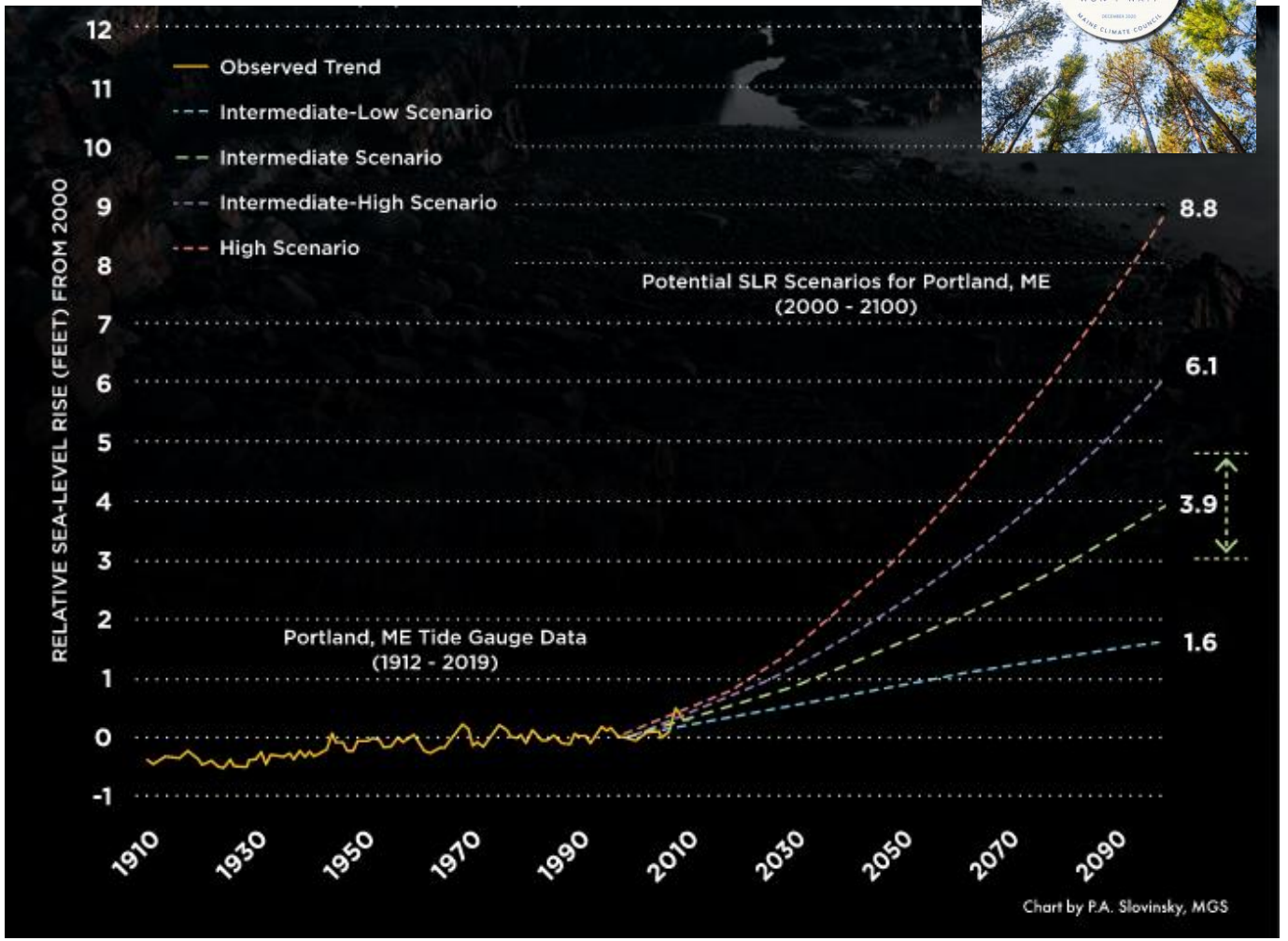
- FEMA storm surge stillwater elevations: "10-year storm," "50-year storm," "100-year storm," "500-year storm"
- Observed January 13, 2024, water surface elevation

Time Horizon:

- Near-Term (Present Day, 2030)
- Medium-Term (2050, 2070)
- Long-Term (2100)

Sea Level Rise Scenarios

Sea Level Rise	
Planning Scenario	**SLR (ft)**
Existing Sea Levels	0
2030: Commit	0.8
2030: Prepare	1.4
2050: Commit	1.5
2070: Commit	2.3
2050: Prepare	3
2100: Prepare	3.9
2070: Prepare	4.9
2100: Prepare	8.8



“High Tides” & Coastal Storm Surge

Water Surface Elevations (NAVD88, ft)						
"High Tides"		Coastal Storm Events				
MHHW	HAT	10 yr	50 yr	100 yr	Max Tide January 13, 2024	500 yr
4.6	6.5	7.9	8.5	8.8	9.3	9.5

Present Day Elevations:

Mean-Higher-High-Water: The average of the higher of the high tides.

Highest Astronomical Tide: The elevation of the highest predicted astronomical tide a specific tide station. No influence of storm action included.

Stillwater elevations due to coastal storm events.

Flood Risk Matrix

63 water levels-> Grouped to 13 scenarios

Sea Level Rise		Water Surface Elevations (NAVD88, ft)						
		"High Tides"		Coastal Storm Events				
Planning Scenario	**SLR (ft)**	**MHHW**	**HAT**	**10 yr**	**50 yr**	**100 yr**	**Max Tide** January 13, 2024	**500 yr**
Existing Sea Levels	0.0	4.6	6.5	7.9	8.5	8.8	9.3	9.5
2030: Commit	0.8	5.4	7.3	8.7	9.3	9.6	10.1	10.3
2030: Prepare	1.4	6.0	7.9	9.3	9.9	10.2	10.7	10.9
2050: Commit	1.5	6.1	8.0	9.4	10.0	10.3	10.8	11.0
2070: Commit	2.3	6.9	8.8	10.2	10.8	11.1	11.6	11.8
2050: Prepare	3.0	7.6	9.5	10.9	11.5	11.8	12.3	12.5
2100: Prepare	3.9	8.5	10.4	11.8	12.4	12.7	13.2	13.4
2070: Prepare	4.9	9.5	11.4	12.8	13.4	13.7	14.2	14.4
2100: Prepare	8.8	13.4	15.3	16.7	17.3	17.6	18.1	18.3

Flood Risk Matrix

Example "grouping:"
9.3 ft - 9.6 ft

Sea Level Rise		Water Surface Elevations (NAVD88, ft)						
		"High Tides"		Coastal Storm Events				
Planning Scenario	**SLR (ft)**	**MHHW**	**HAT**	**10 yr**	**50 yr**	**100 yr**	**Max Tide** January 13, 2024	**500 yr**
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2030: Prepare	1.4	6.0	7.9	9.3	9.9	10.2	10.7	10.9
2050: Commit	1.5	6.1	8.0	9.4	10.0	10.3	10.8	11.0
2070: Commit	2.3	6.9	8.8	10.2	10.8	11.1	11.6	11.8
2050: Prepare	3.0	7.6	9.5	10.9	11.5	11.8	12.3	12.5
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2100: Prepare	8.8	13.4	15.3	16.7	17.3	17.6	18.1	18.3

Flood Risk Matrix

13 total “groups”

Sea Level Rise		Water Surface Elevations (NAVD88, ft)						
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2100: Prepare	8.8	13.4	15.3	16.7	17.3	17.6	18.1	18.3

Flood Scenarios

Mapping Scenario	Water Level (ft, NAVD88)
1	7.3
2	8.0
3	8.8
4	9.6
5	10.4
6	11.1
7	11.8
8	12.8
9	13.7
10	14.4
11	15.3
12	16.7
13	18.3

Near-Term Flood Risk

Medium-Term Flood Risk

Long-Term Flood Risk

Flood Scenarios

What this study will not include and other assumptions:

- **Detailed Wave Modeling**
  - **Will likely use "rules of thumbs" and/or existing data (i.e., FEMA BFE)**
  - **Recommend incorporating ME-MCFRM model when results available**

- **Will assume tidal transparency throughout the marsh**

- **More detailed marsh modeling will become available through Scarborough Land Trust / NOAA marsh restoration project**

GIS/Asset Data to Include in Study

** Data Required
*** Verify Inclusion

Transportation Infrastructure

- Roads
- EV Charging
- Parking Lots
- Rail Lines
- School Bus Routes and Stops**
- Sidewalks

Power Utilities

- Light poles/streetlights
- Substations**

Sewer Utilities

- Manholes
- Sewer Pump Stations
- Treatment Plant

Public Health & Safety

- Brownfield Sites
- Fire Hydrants**
- Fire Stations
- Hospitals
- Petroleum Tanks
- Police Stations
- Wells***

Buildings/Structures

- Structures (buildings, etc.)
- Tax Parcel Information***
  - Residential
  - Commercial
  - Non-Profit
  - Institutional
  - Municipal

Drainage Utilities

- Dams
- Catch Basins
- Culverts
- Outfalls
- Outlet Control Structures

Conservation and Recreation

- Beaches
- Parks and Open Spaces
- Sand Dunes
- Walking Trails
- Wetlands

Coastal Structures

- Boat Ramps
- Breakwaters**
- Revetments**
- Seawalls**

GIS Asset Data

- **Will need any additional GIS data soon (by mid-June) for asset to be included in vulnerability assessment**
- **Planning for one day of field survey using RTK equipment to verify "critical elevations" for certain infrastructure**
- **Two drone flights throughout duration of project (before/after storm event)**

Vulnerability Assessment Results Example

Example Length Data:

Table 4. Transportation Flood Exposure Summary (Miles Inundated)

Transportation Asset	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Roads	-	0.7	1.1	0.1	1.5	2.3	0.6	2.8	3.0	0.9	3.0	3.3	3.4	4.9	5.4
Bus Routes	-	0.2	0.3	<0.1	0.5	0.7	0.2	0.9	0.9	0.3	0.9	1.0	1.0	1.3	1.3
Sidewalks	-	0.3	0.4	0.1	0.7	1.1	0.2	1.5	1.6	0.4	1.7	1.7	1.8	2.5	2.6
Railroads	-	0.1	0.1	<0.1	0.2	0.3	<0.1	0.5	0.5	0.1	0.5	0.5	0.5	0.6	0.6

Example Y/N Point Data:

Table 12. Pump Stations Flood Exposure Summary (Y/N)

Pump Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Total Impacted	-	***4***	***4***	-	***4***	***5***	***2***	***6***	***6***	***4***	***7***	***7***	***7***	***9***	***9***
Hunt St	-	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Commercial St	-	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Harward St	-	Y	Y	-	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y
Private - BIW North Yard	-	Y	Y	-	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y
Castine Ave	-	-	-	-	-	Y	-	Y	Y	-	Y	Y	Y	Y	Y
Riverview Rd	-	-	-	-	-	-	-	Y	Y	-	Y	Y	Y	Y	Y
Private - Bath Canning Co	-	-	-	-	-	-	-	-	-	-	Y	Y	Y	Y	Y
Bridge St	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	Y
Farrin Place	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	Y

Town Ordinances

- Chapter 405, Zoning Ordinance
- Chapter 405A, Floodplain Management Ordinance
- Chapter 405B, Site Plan Review Ordinance
- Chapter 405C, Shoreland Zoning Ordinance

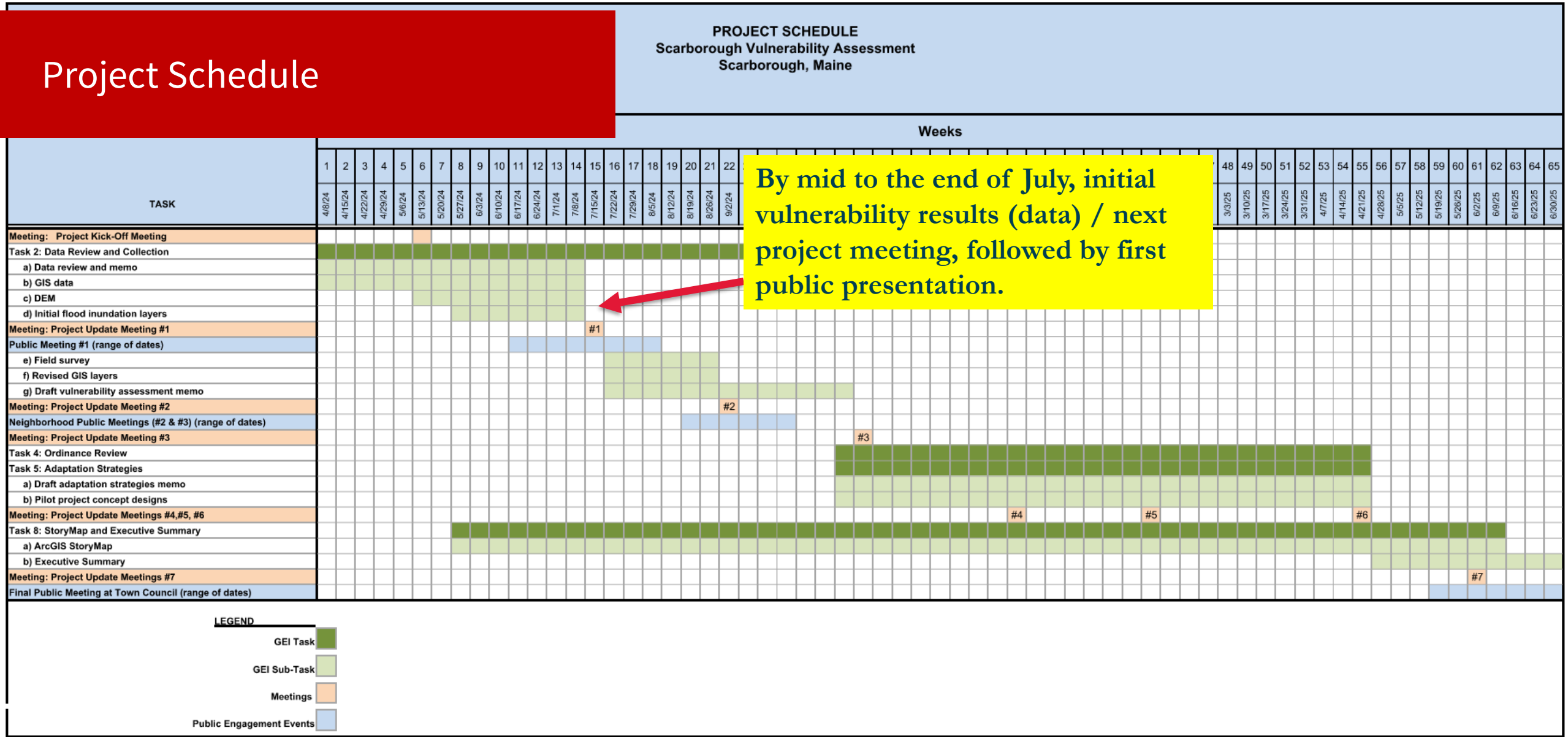
Community Engagement Plan

How do we get information to the public?

- Deadlines for local paper / newsletter information
- Town website updates
- Social media posts

Project Schedule

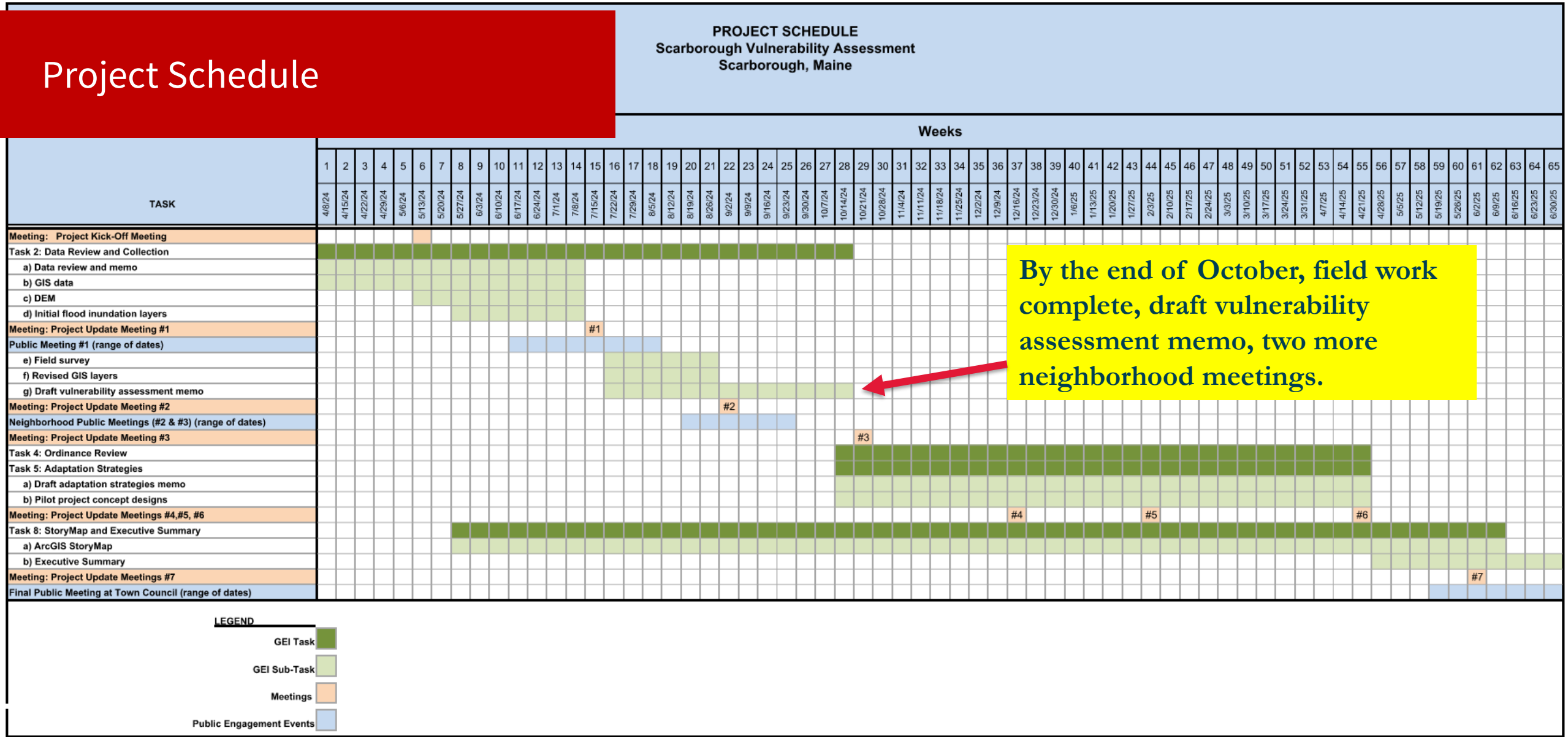
PROJECT SCHEDULE
Scarborough Vulnerability Assessment
Scarborough, Maine



By mid to the end of July, initial vulnerability results (data) / next project meeting, followed by first public presentation.

Project Schedule

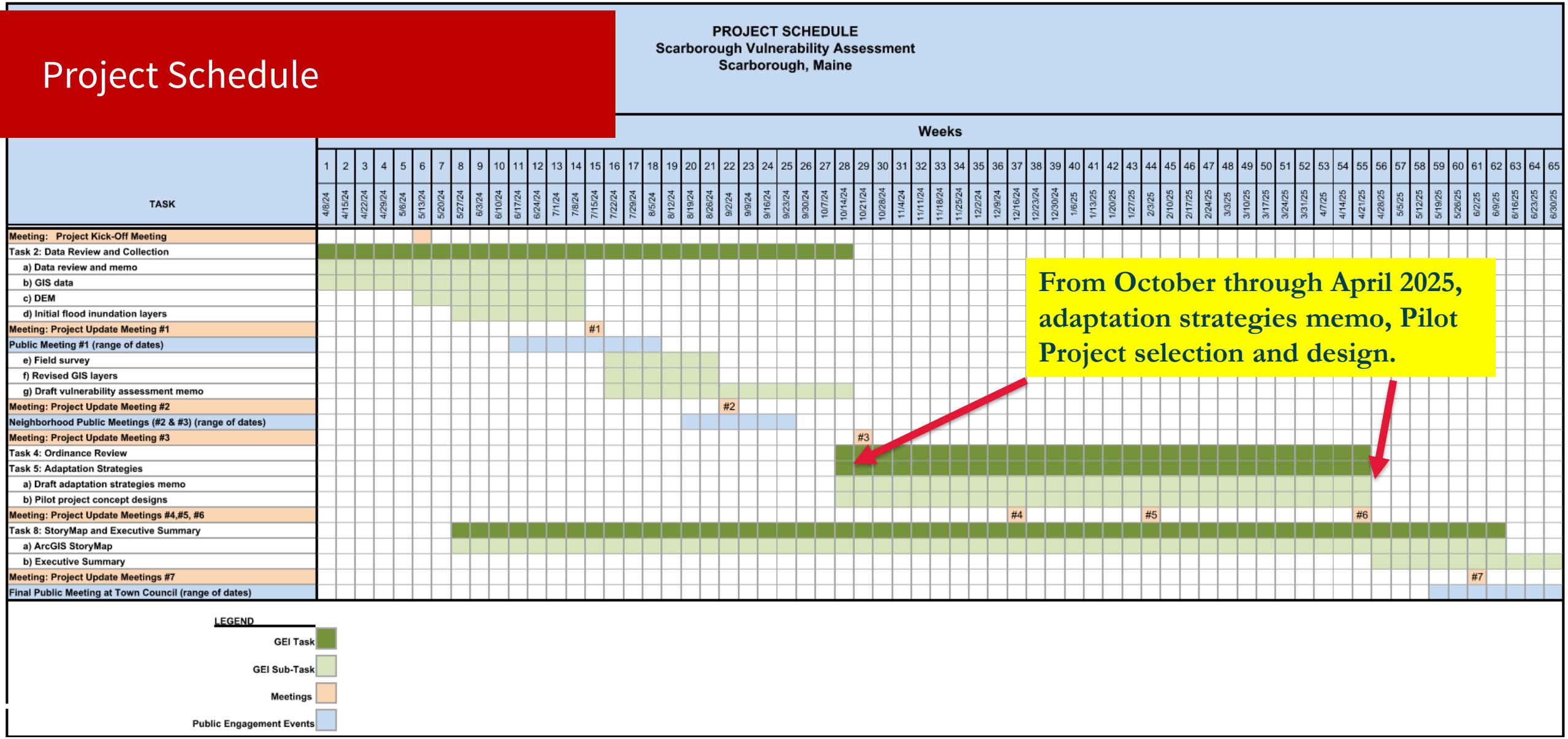
PROJECT SCHEDULE
Scarborough Vulnerability Assessment
Scarborough, Maine



By the end of October, field work complete, draft vulnerability assessment memo, two more neighborhood meetings.

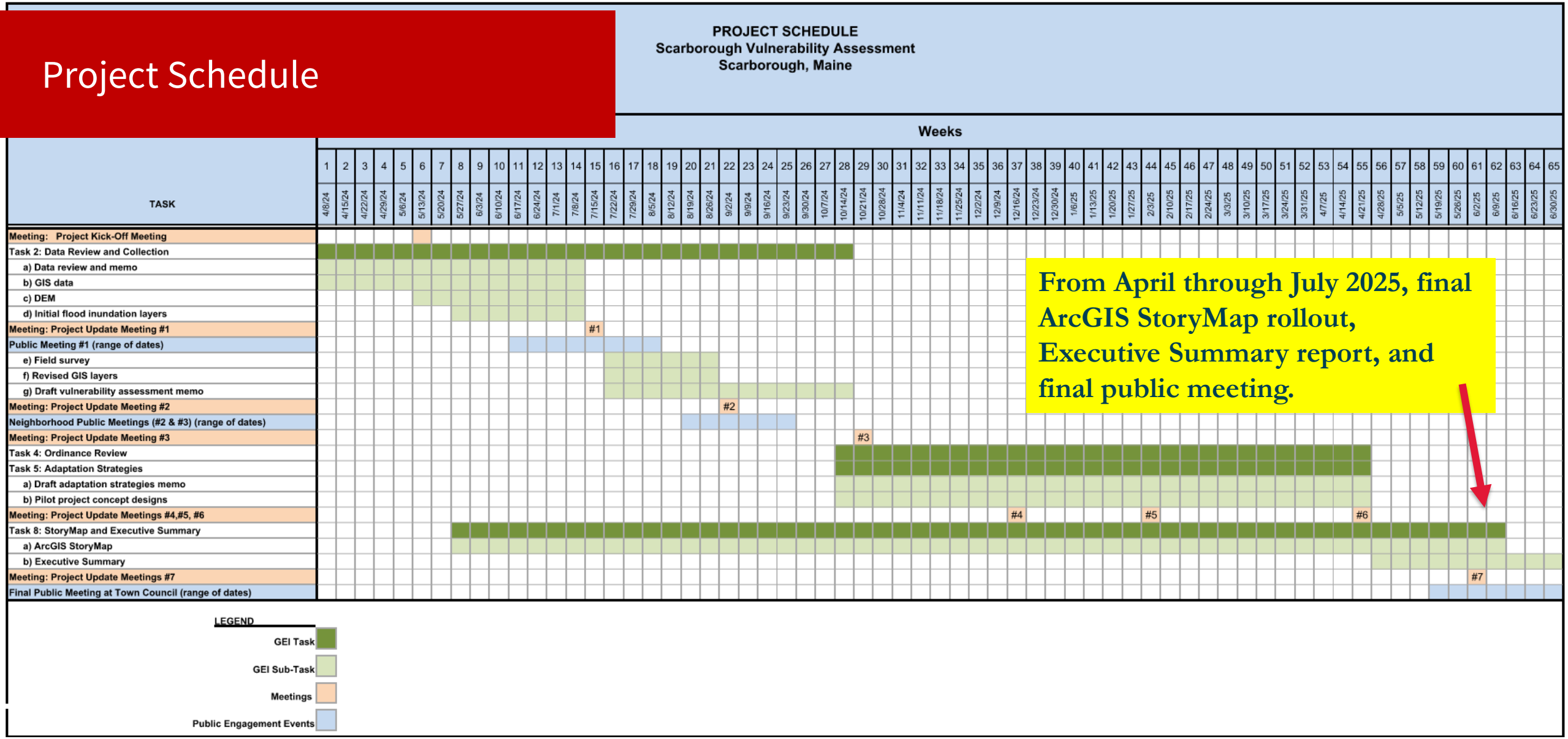
Project Schedule

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Scarborough Vulnerability Assessment
Scarborough, Maine



Project Schedule

PROJECT SCHEDULE
Scarborough Vulnerability Assessment
Scarborough, Maine



From April through July 2025, final ArcGIS StoryMap rollout, Executive Summary report, and final public meeting.

Next Deliverables

Data Review Memo: Task 2.1

- Summary of flood vulnerability data reviewed and used as part of this study.
- Goal deadline: end of July, before Project Meeting #1.

Initial Web-Based Flood Inundation Viewer (not for public)

- To convey flood extents to project team.
- Goal deadline: end of July, before Project Meeting #1.

Next Community Events

Initial public meeting to provide an overview of the project.

- **Mid-June to Mid-August timeframe.**

Neighborhood-specific meetings for Pine Point and Higgins Beach neighborhoods.

- **Mid-August to Mid-September timeframe.**

Next Project Meeting

Project Update Meeting #1:

- Virtual meeting the week of July 15, 22, or 29th

Purpose:

- Review initial flood extents and verify assets for additional field survey data.
- Discuss summer schedule for field work and public engagement events.



Thank you!
Questions?

GEI Consultants

Consulting Engineers and Scientists

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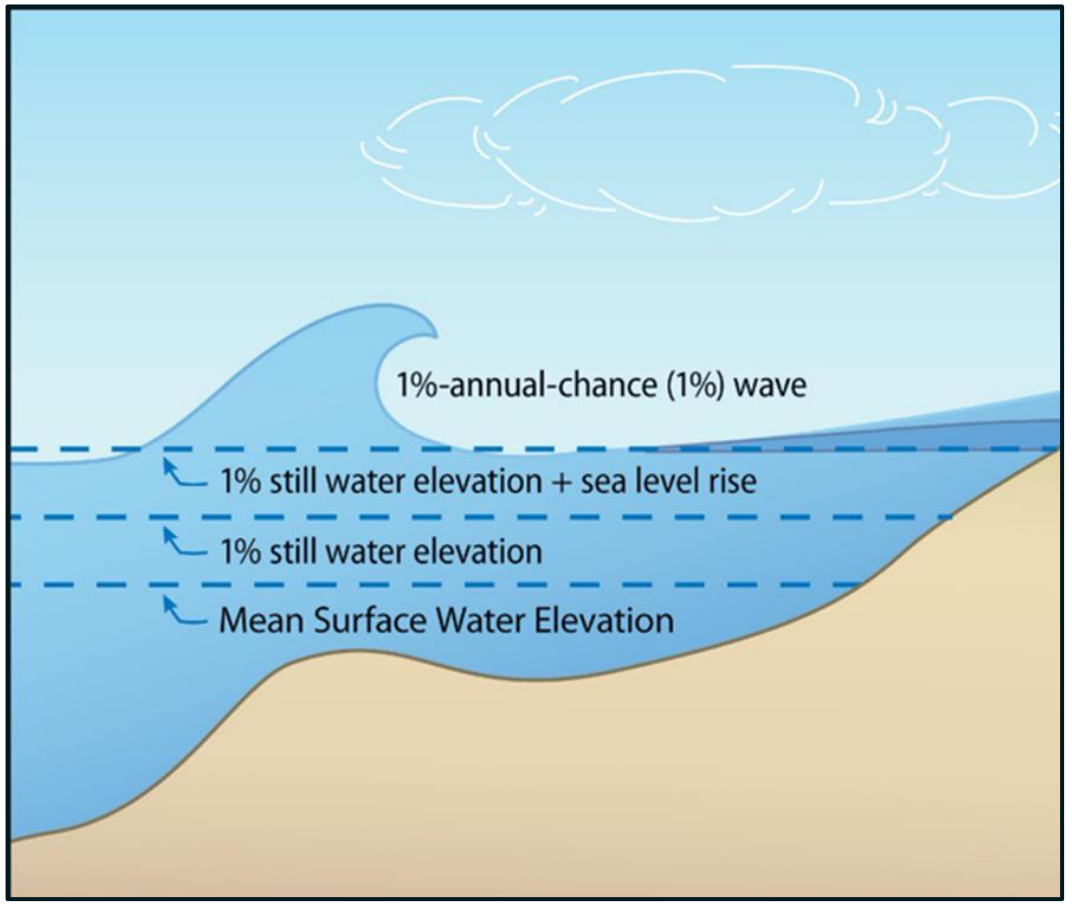
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Flood Scenarios

What causes high water?

- High tides (including astronomical tides)
- Coastal storm surge
- Sea level rise
- Wave action*

***Detailed modeling to understand wave action for flood scenarios will not be included in this study.**



Flood Scenarios

		Flood Risk Time Horizon	
Mapping Scenario	Water Level (ft, NAVD88)	Coastal Storm Event	"High Tide"
1	7.3	Now	2030
2	8.0	Now	2030
3	8.8	Now	2050
4	9.6	Now	2050
5	10.4	2030	2070
6	11.1	2030	2070
7	11.8	2050	2070
8	12.8	2050	2100
9	13.7	2070	2100
10	14.4	2070	2100
11	15.3	2100	2100
12	16.7	2100	2100
13	18.3	2100	2100