Town of Scituate

Comprehensive Master Plan Update

Community Forum #2

October 22, 2019

Resiliency Workshop

Agenda

1. Introduction and Process

2. Threats
   (Sea Level Rise – Climate Change – Municipal Resources – Demographics)

3. Existing Conditions
   (Assets – Infrastructure – Circulation)

4. Recommendations

5. Interactive Session
   (Mapping Assets – Prioritizing)

6. Next Steps

1. Introduction and Process

SeaScituate 2040 MASTER PLAN PROCESS

1. **Start Up** — July/Aug 2019
2. **Data Collection and Analysis** — Aug/Oct 2019
3. **Community Vision and Goals** → Community Forums and Thematic Workshops
4. **Development of Plan Elements** — Oct 2019 / Jan 2020
5. **Draft Plan and Review** — Feb/Apr 2020 — Community Review
6. **Final Plan and Approval** — May/Jun 2020 — Planning Board

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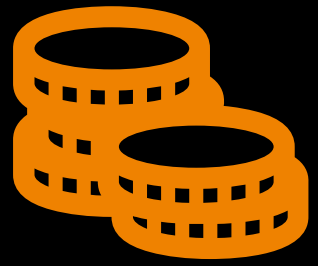
2. Threats

Sea Level Rise

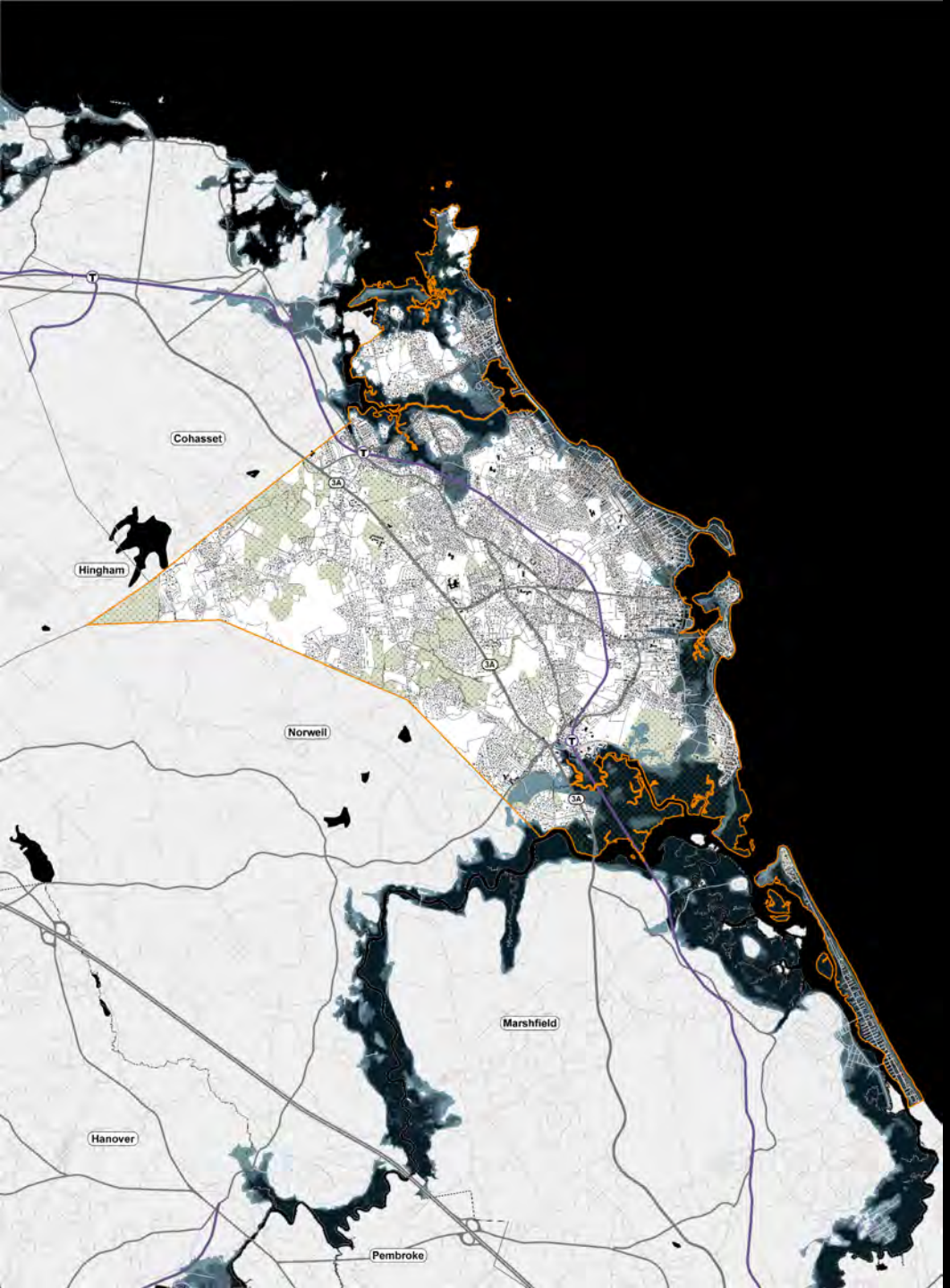
Climate Change

Lack Of Municipal Resources



Changing Demographics

Changes to Demand



Sea Level Rise

	3ft	5ft
SLR / Daily Inundation	2080	2130
100% Chance of Flood	2040	2090

Source: NOAA (National Oceanic and Atmospheric Administration)

SLR= Sea Level Rise at normal conditions or daily inundation

100% Chance= One Flood Chance in a Year

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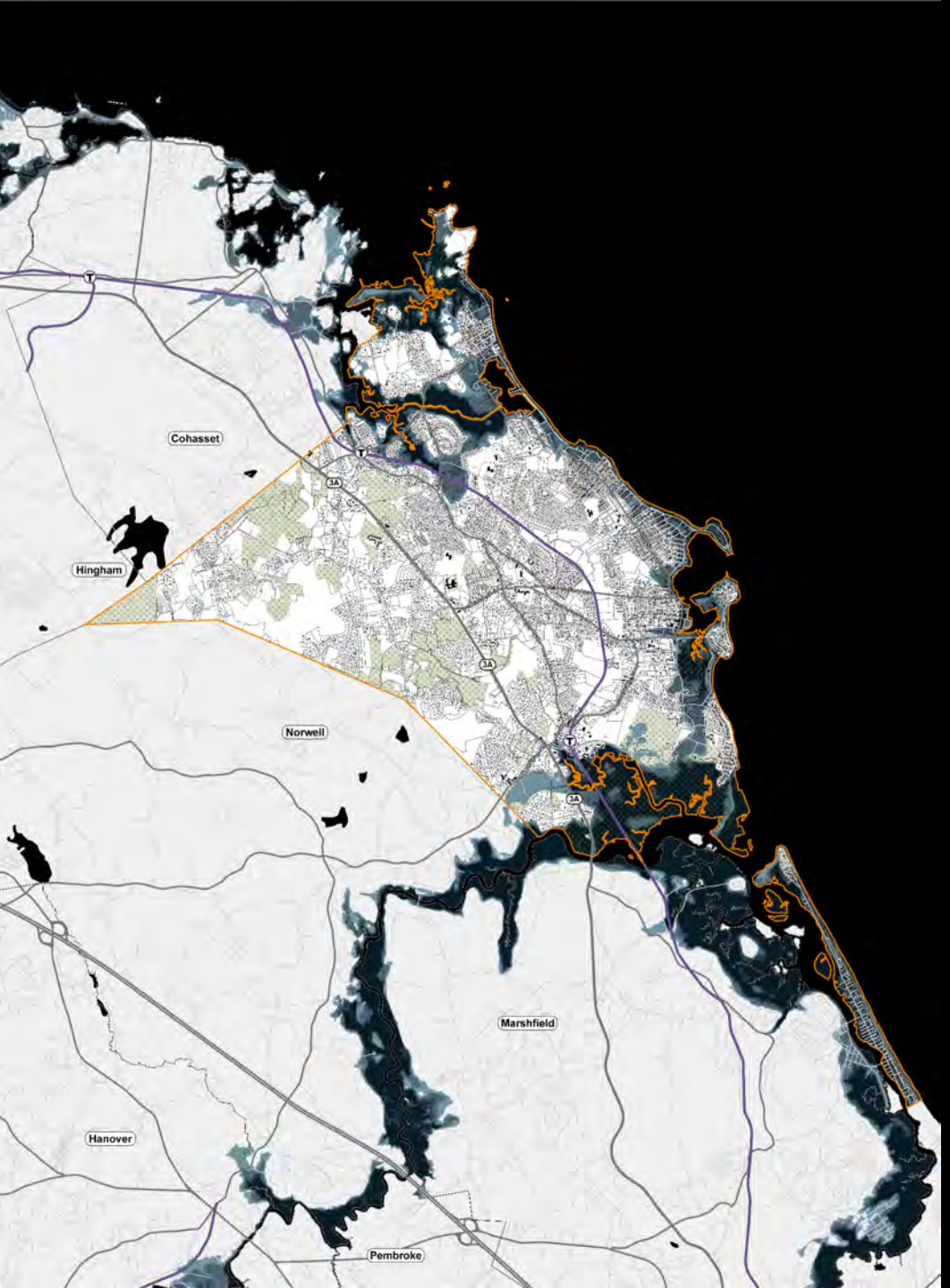
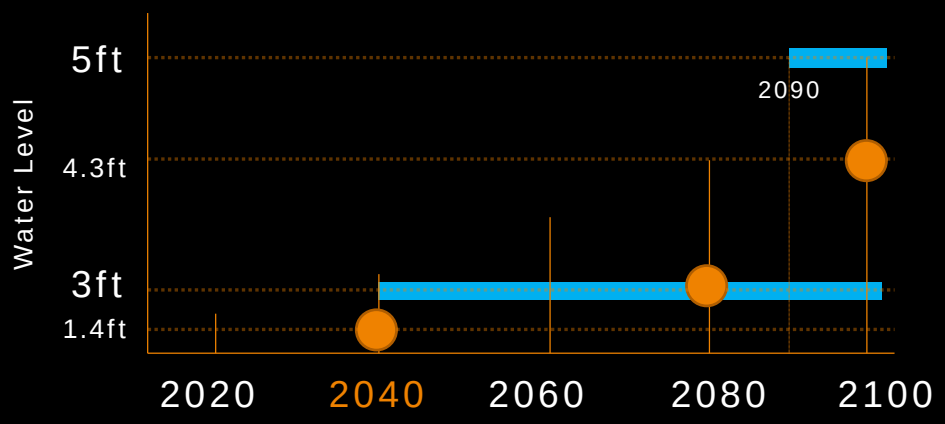


Sea Level Rise



SLR / Daily Inundation — Sea Level Rise at Normal Conditions or Daily Inundation

100% Chance of Flood — 1 Flood Chances In A Year

Source: NOAA (National Oceanic and Atmospheric Administration)

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Sea Level Rise

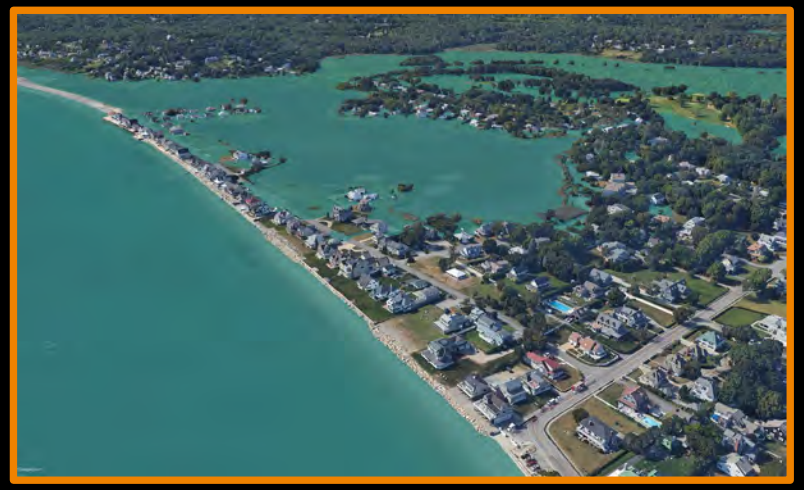
Scituate, MA

Scituate, MA

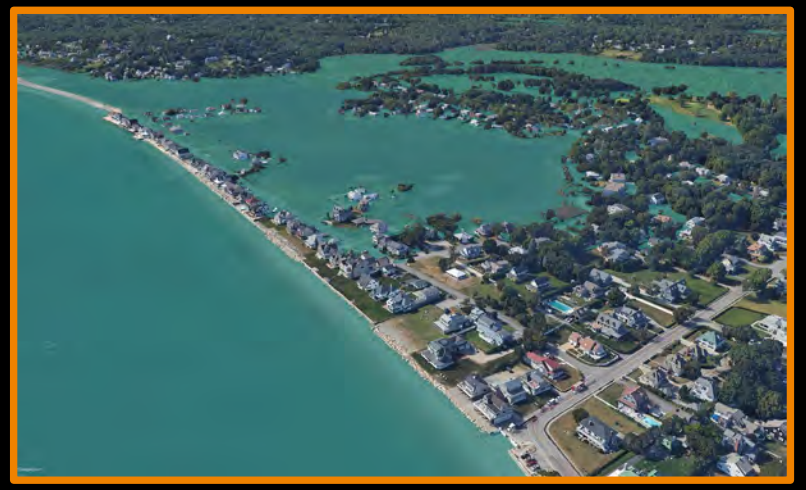
Source: WBUR, Jesse Costa 2015

Sea Level Rise

Beachfront



3 ft Sea Level Rise



5 ft Sea Level Rise

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Sea Level Rise

Lighthouse

3 ft Sea Level Rise

5 ft Sea Level Rise

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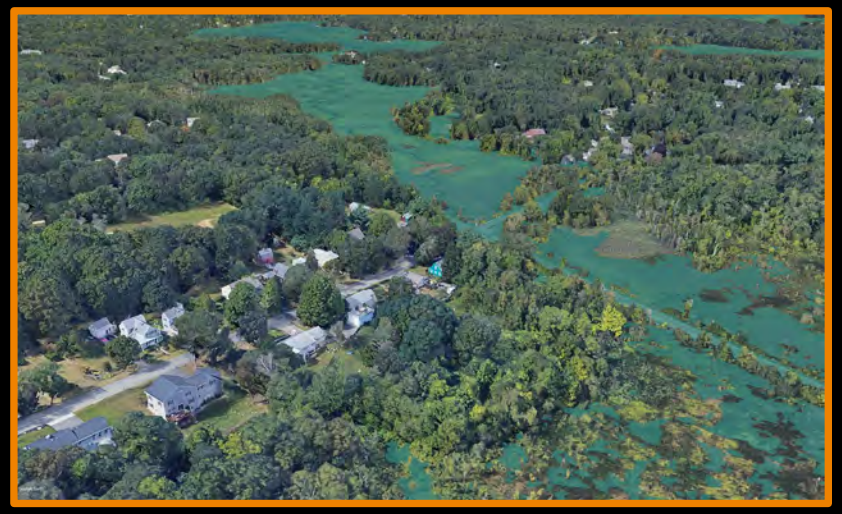
Sea Level Rise

Railroad



3 ft Sea Level Rise

5 ft Sea Level Rise

HARRIMAN | HOWARD STEIN HUDSON

Sea Level Rise

Water Department

3 ft Sea Level Rise

5 ft Sea Level Rise

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Sea Level Rise

Humarock

3 ft Sea Level Rise

5 ft Sea Level Rise

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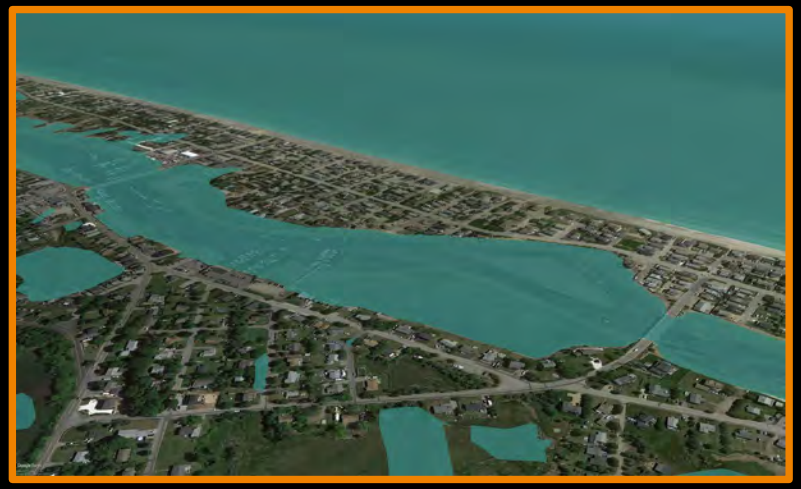
Sea Level Rise

Humarock Bridges



3 ft Sea Level Rise

5 ft Sea Level Rise

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Climate Change

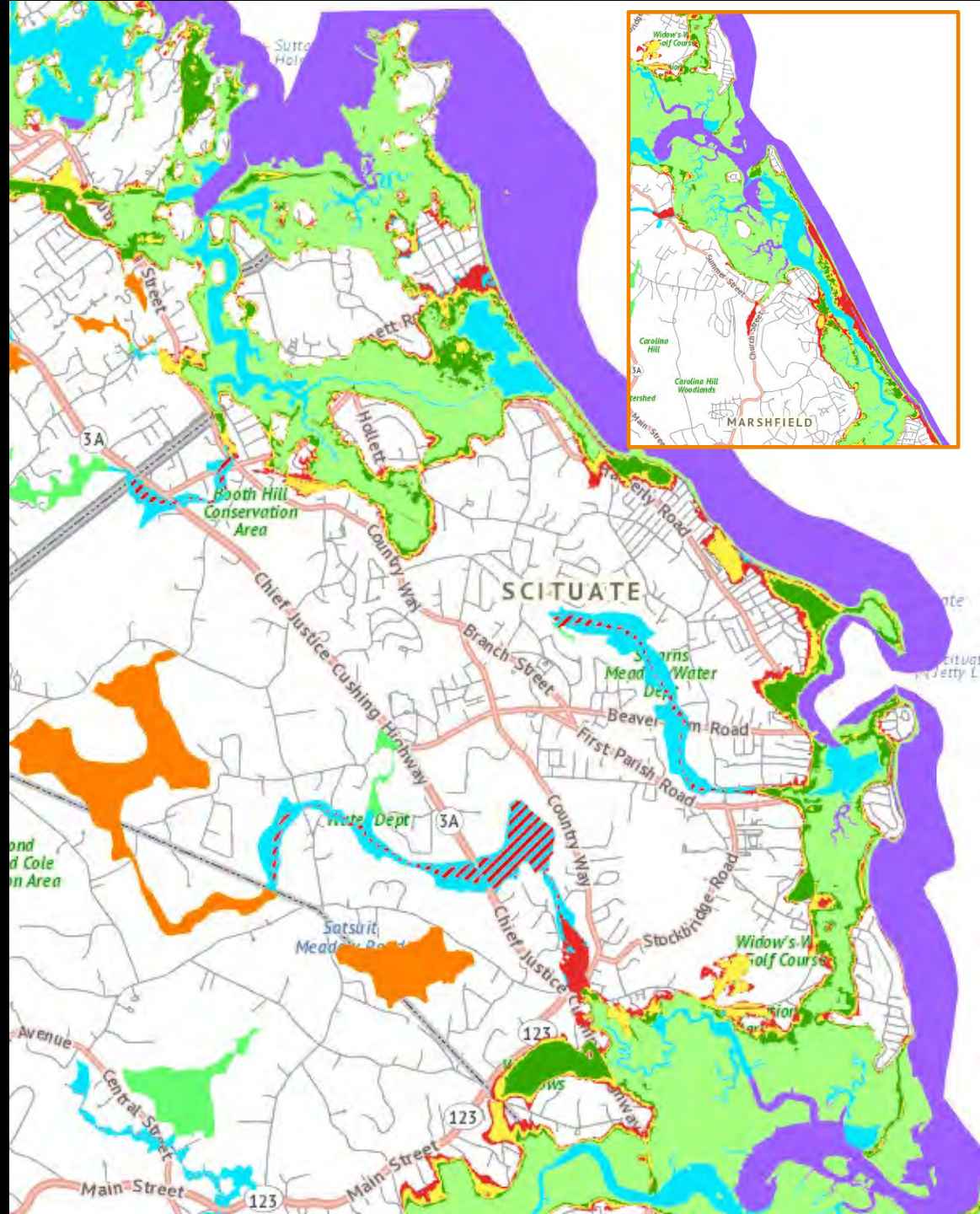
30-45% of residential land in Scituate is within the 100-year flood zone

0-13% of residential land in Scituate is within the 500-year flood zone

20.9-31.6% of population s over 65 years old

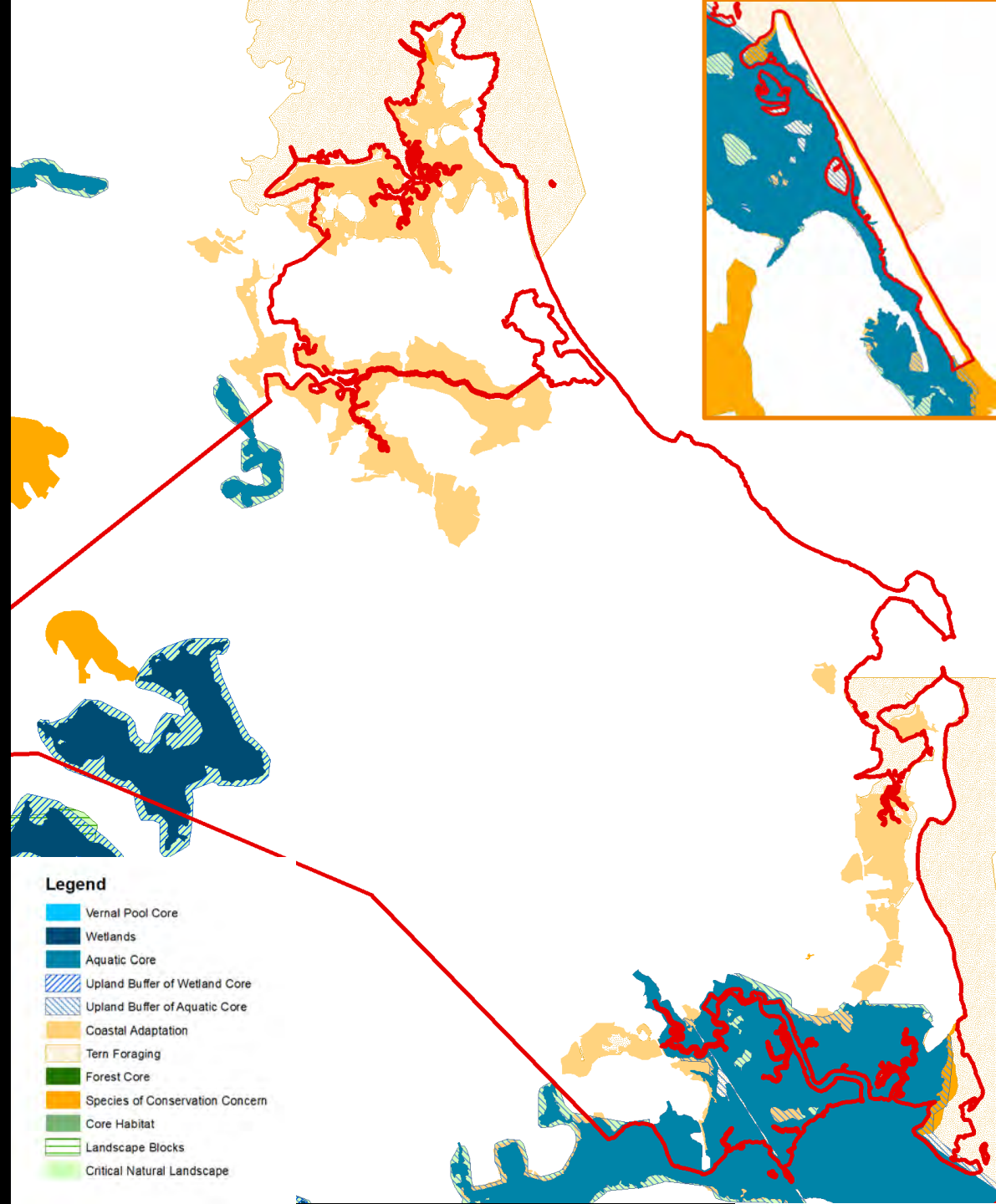
19.0-25.2% of population is under 15 years old

https://matracking.ehs.state.ma.us/Climate-Change/map-vulnerable-population.html



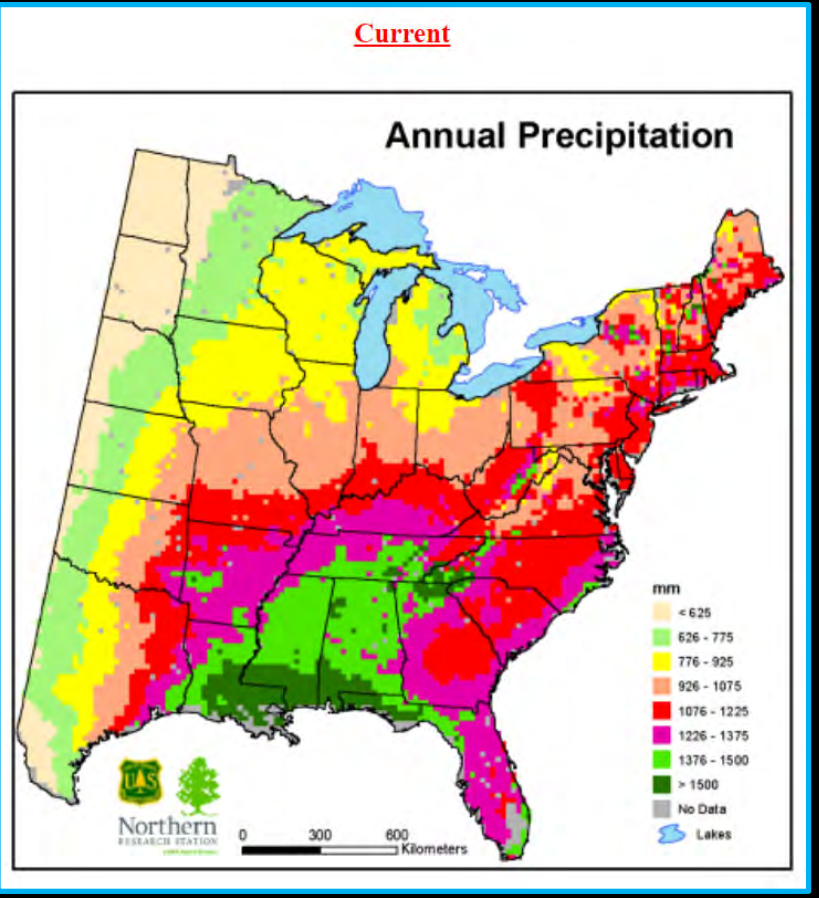
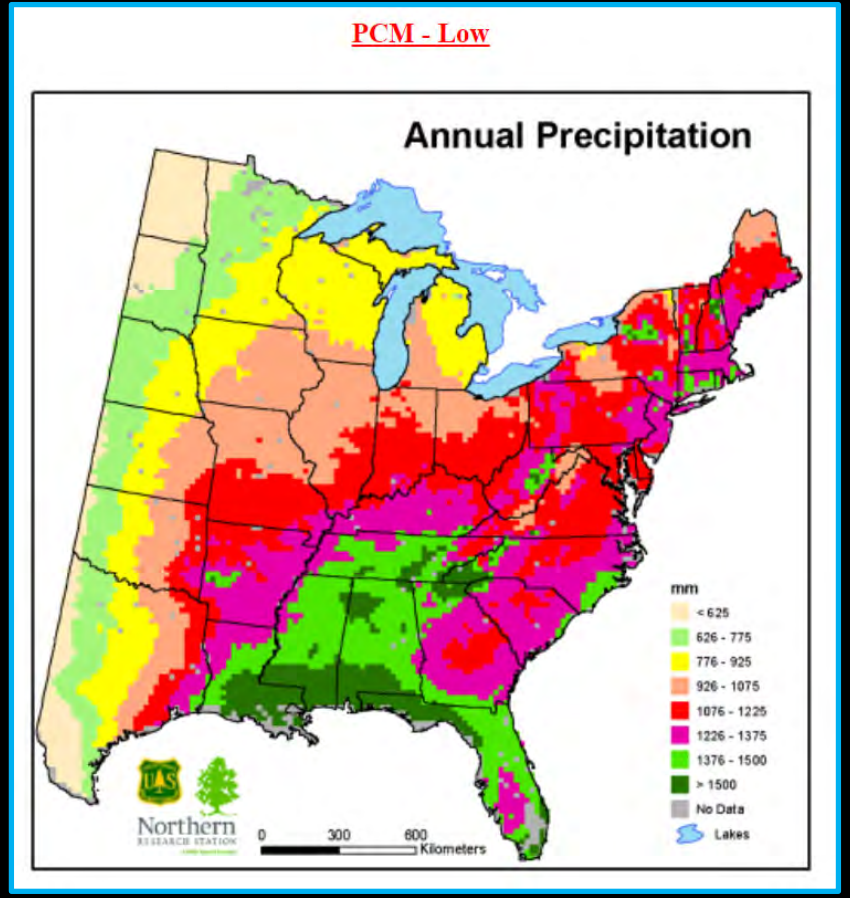
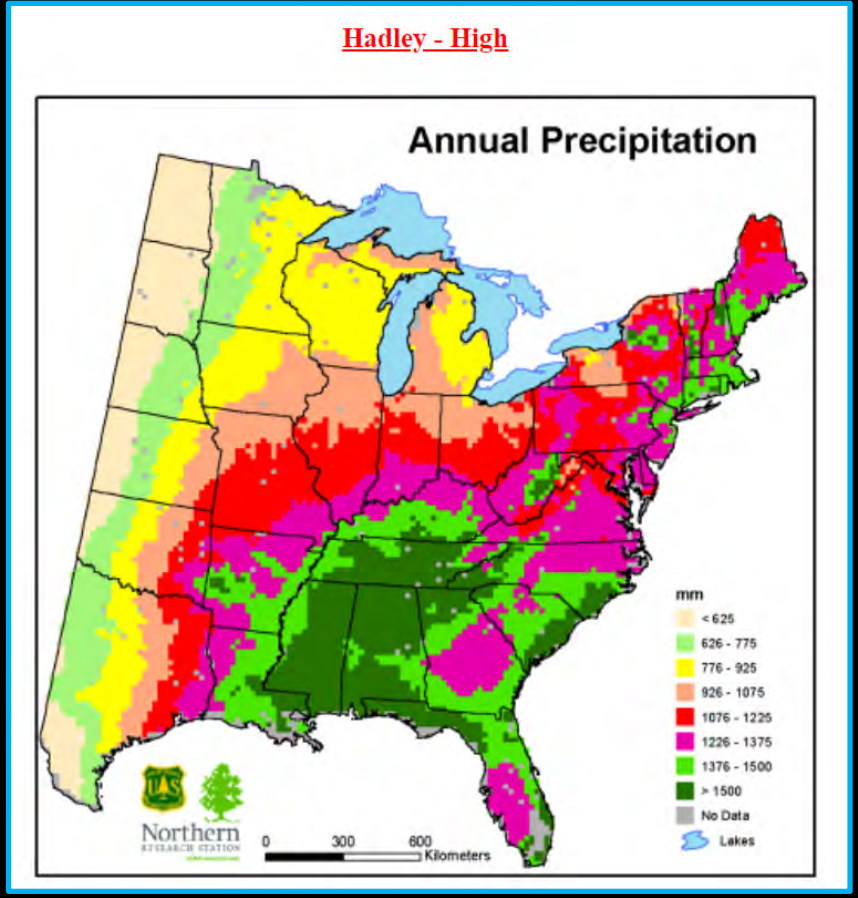
Climate Change

https://www.mass.gov/service-details/biomap2-conserving-the-biodiversity-of-massachusetts-in-a-changing-world



Annual Precipitation

Temperatures by 2100

Current (2000)	PCM – Low Emission Scenario	Hadley – High Emission Scenario
		
1076-1225mm (42.36-48.22 in)	1226-1375mm (48.26-54.13 in)	1376-1550mm (54.17-61.02 in)
	12.2-13.8% mm	26.5-27.9% mm

https://www.nrs.fs.fed.us/atlas/tree/Predictors.html

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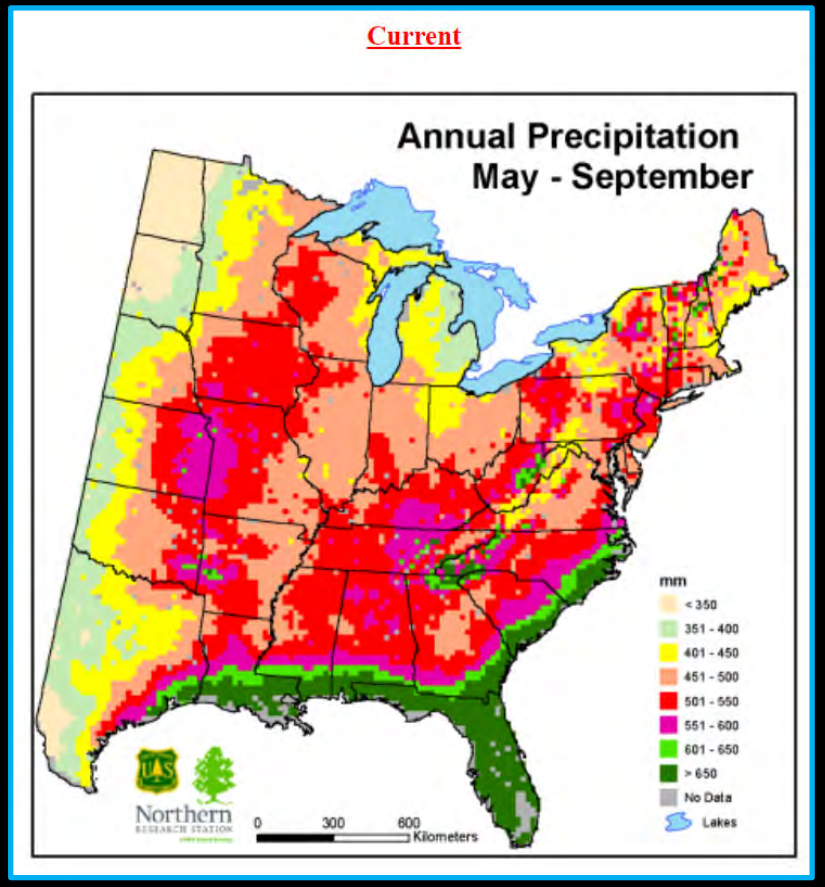
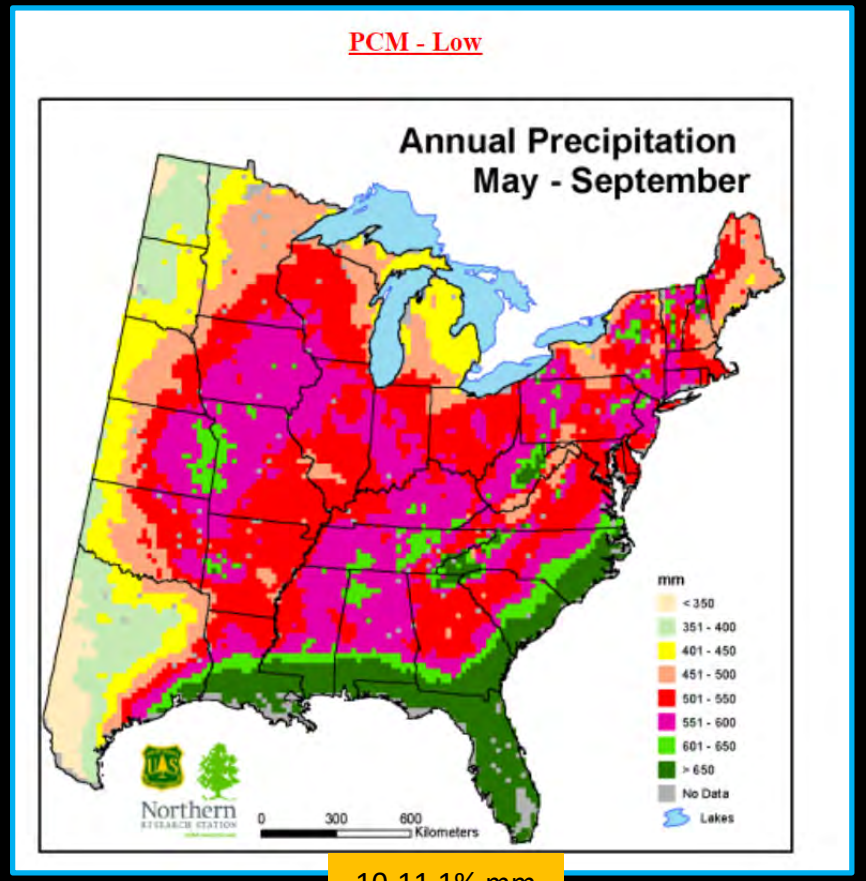
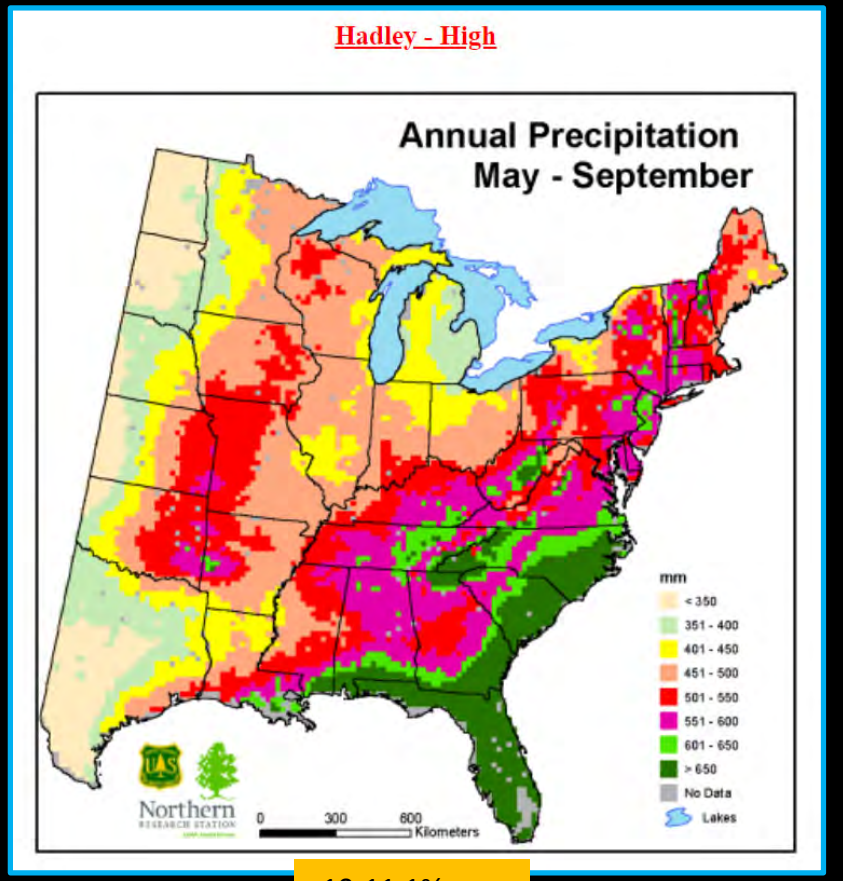
May-September Precipitation

Temperatures by 2100

Current (2000)	PCM – Low Emission Scenario	Hadley – High Emission Scenario
		
451-500mm (17.72-19.68 in)	501-550mm (19.72-21.65 in)	501-550mm (19.72-21.65 in)
625-725mm (24.60-28.54 in)	725-825mm (28.54-32.48 in)	874-1,000mm (34.41-39.37 in)

10-11.1% mm

13.7-16% mm

10-11.1% mm

37.9-39.8% mm

Oct-April Est.

https://www.nrs.fs.fed.us/atlas/tree/Predictors.html

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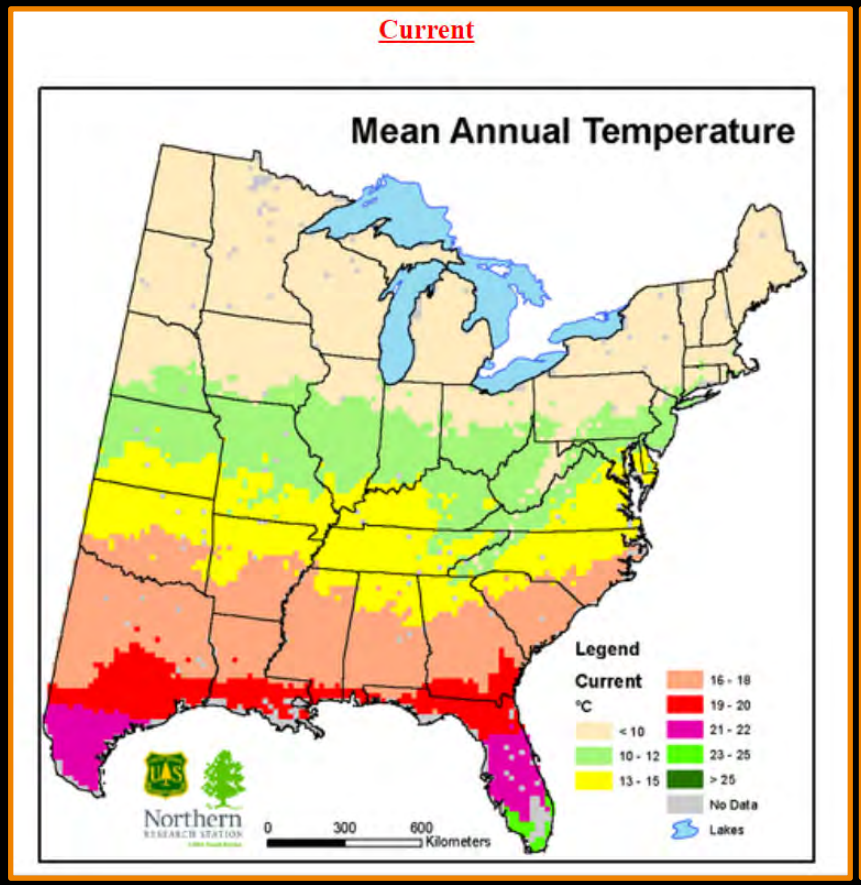
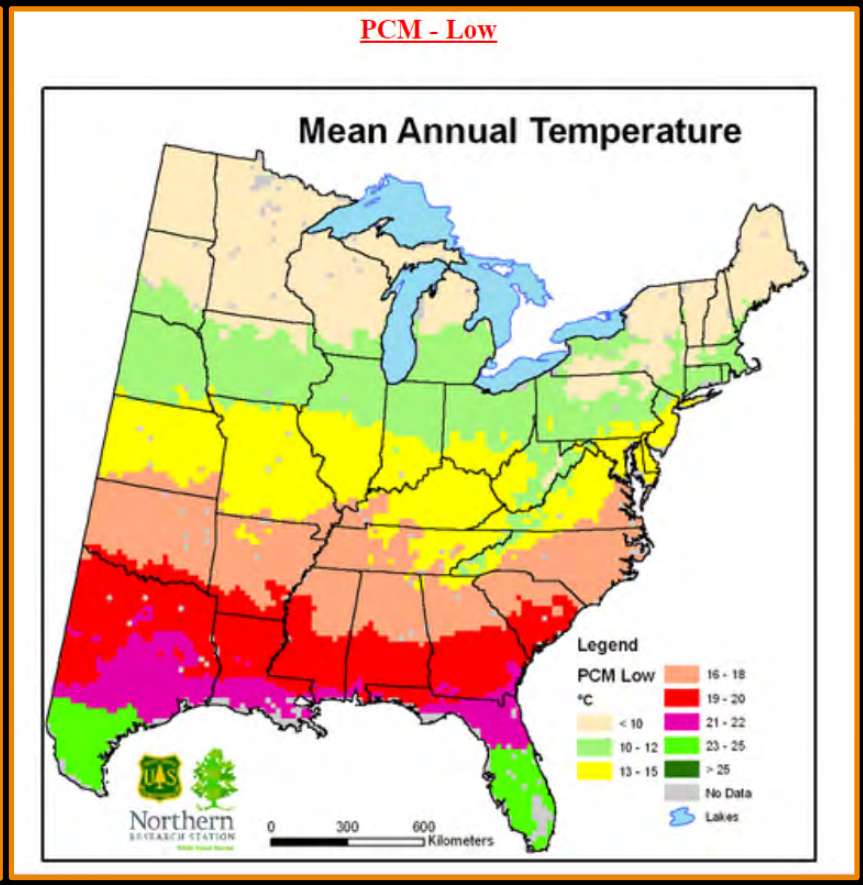
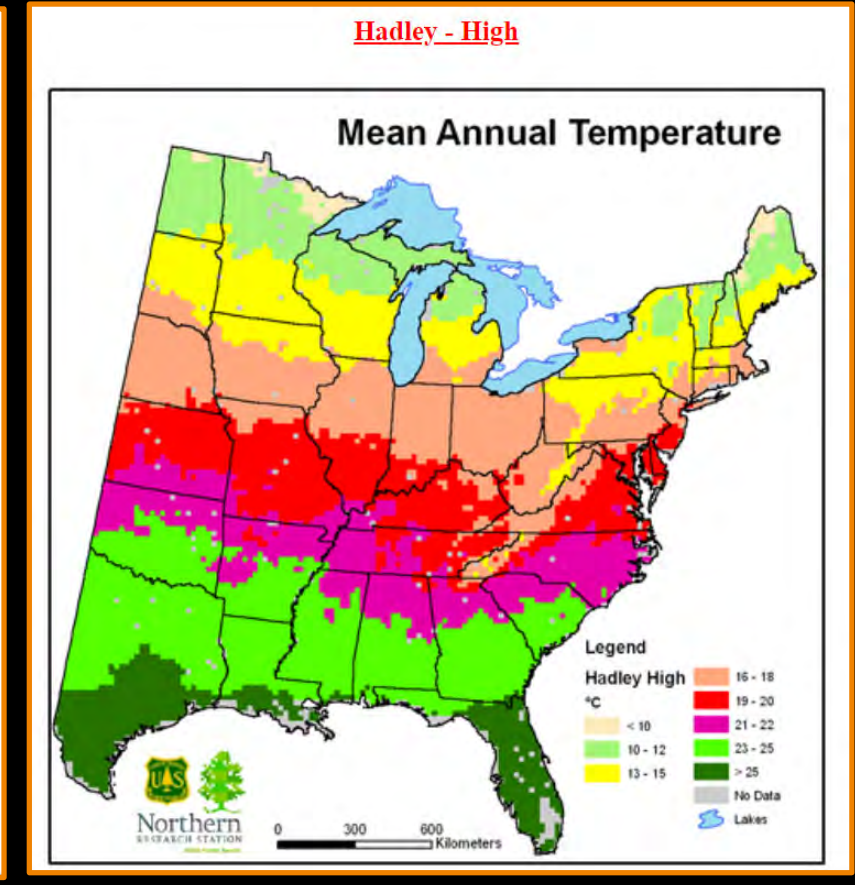
Mean Annual Temperature

Temperatures by 2100

Current (2000)	PCM – Low Emission Scenario	Hadley – High Emission Scenario
		
<10°C (<50°F)	10-12 °C (50-53.6°F)	16-18 °C (60.8-64.4°F)
	0-7.2% °F	21.6-28.8% °F

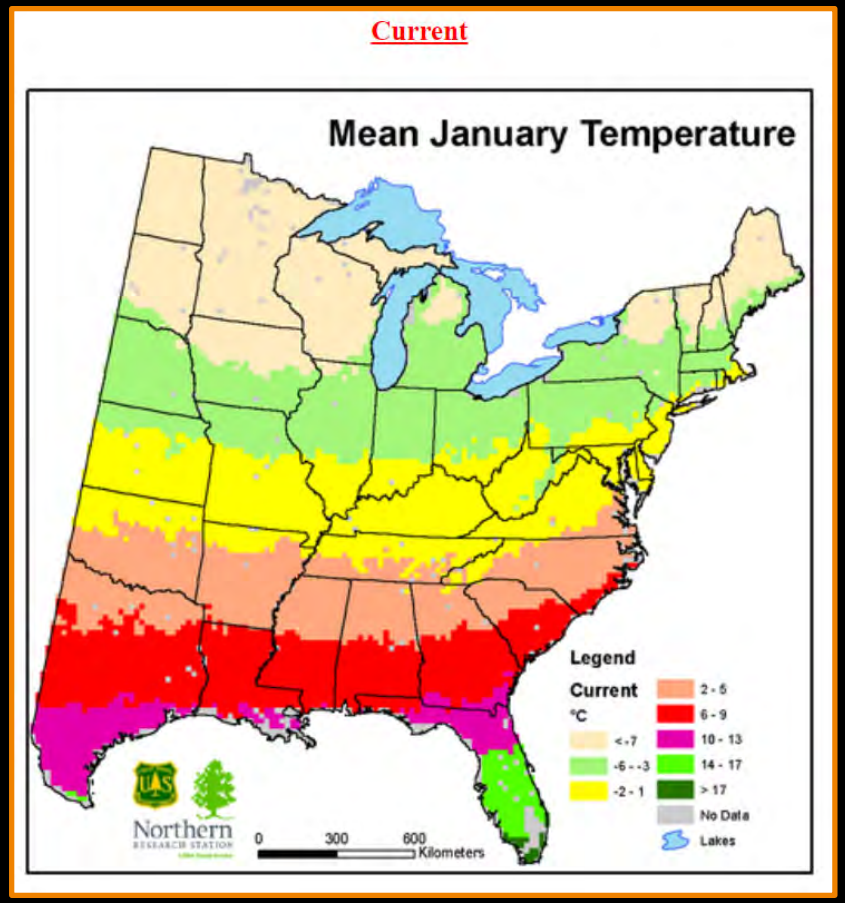
https://www.nrs.fs.fed.us/atlas/tree/Predictors.html

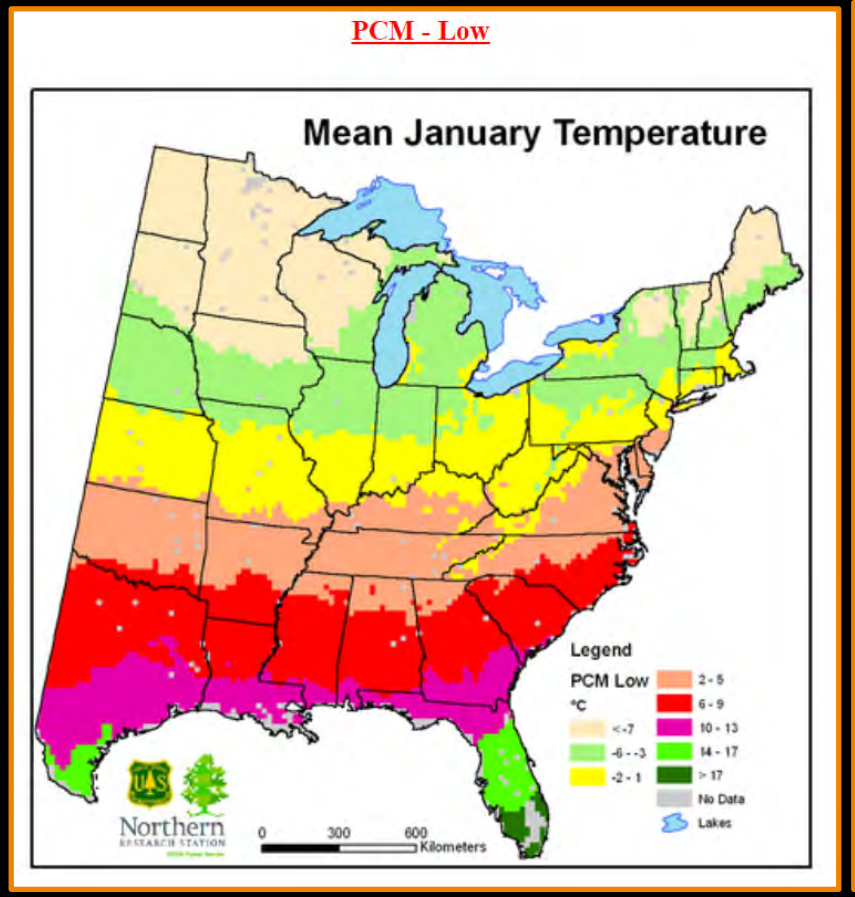
HOWARD STEIN HUDSON

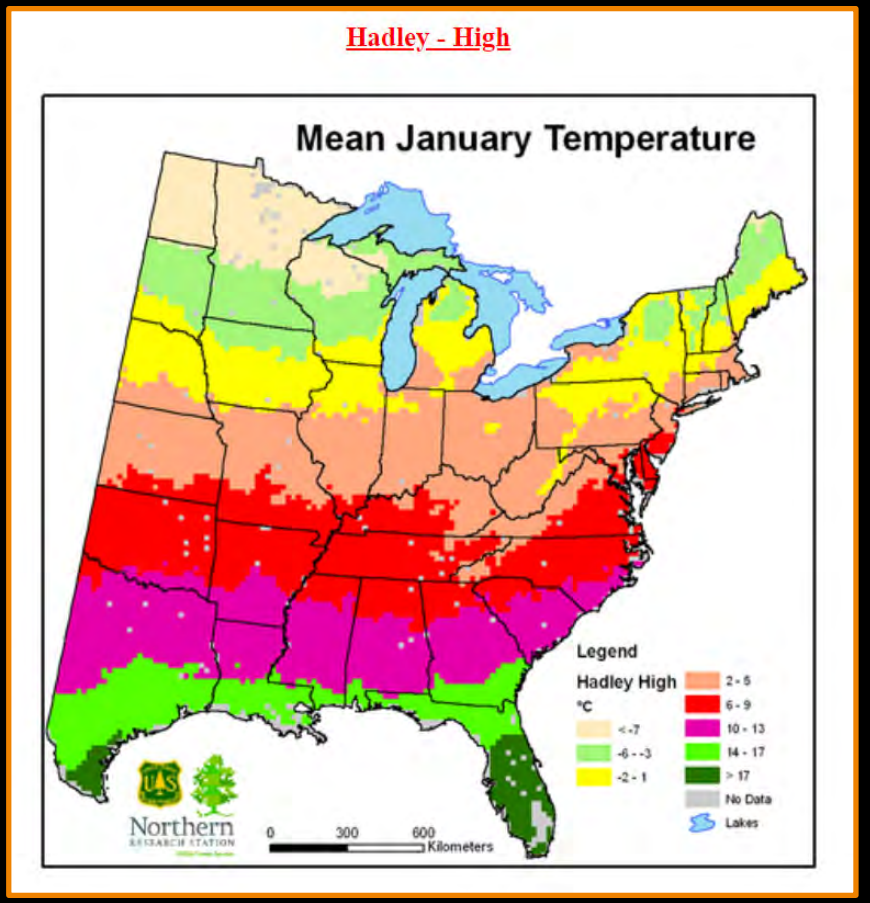
Mean January Temperature

Temperatures by 2100

Current (2000)	PCM – Low Emission Scenario	Hadley – High Emission Scenario







-6 to -3°C (21.2-26.6°F) -2 to 1°C (28.4-33.8°F)	-2 to 1°C (28.4-33.8°F)	2-5°C (35.6-41°F)
	27.1-33.9% °F	54.1-67.9% °F

https://www.nrs.fs.fed.us/atlas/tree/Predictors.html

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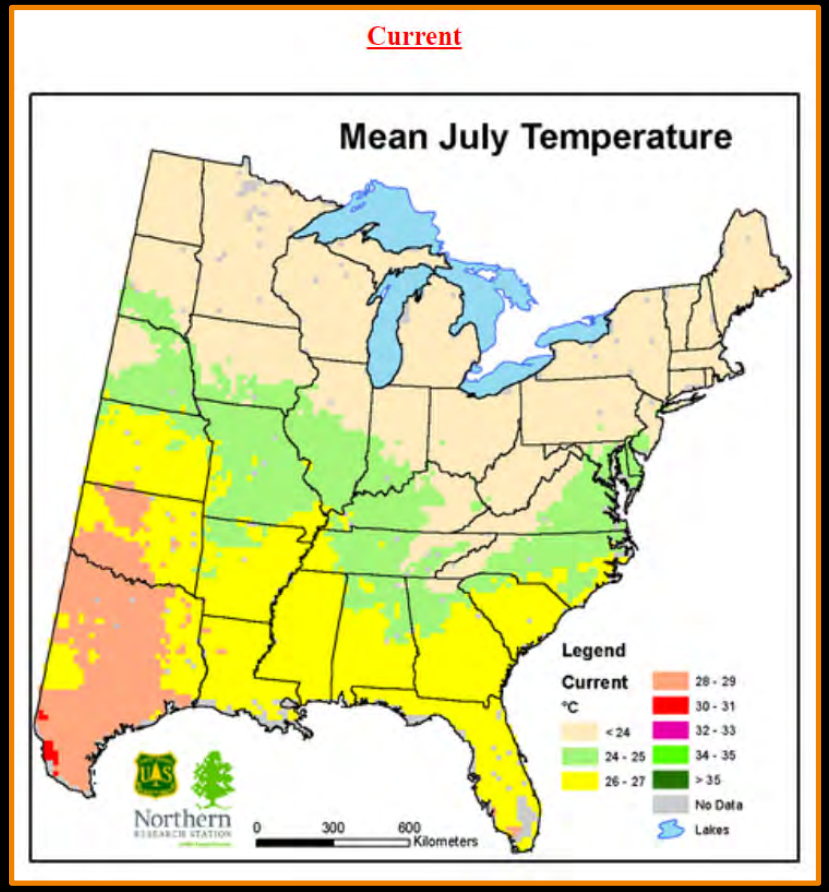
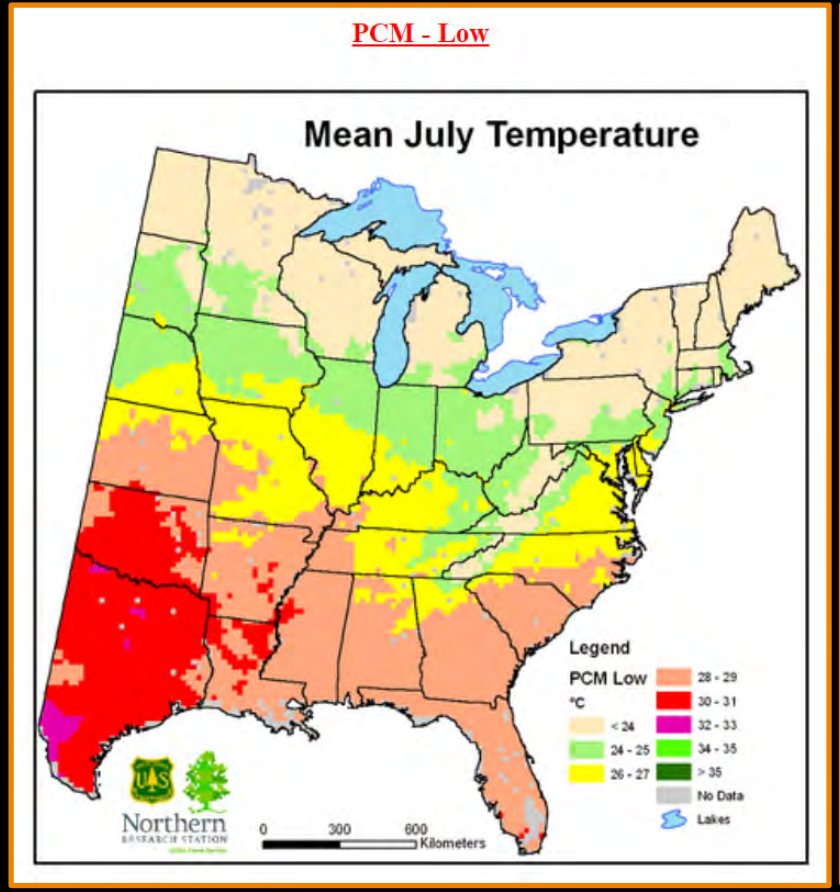
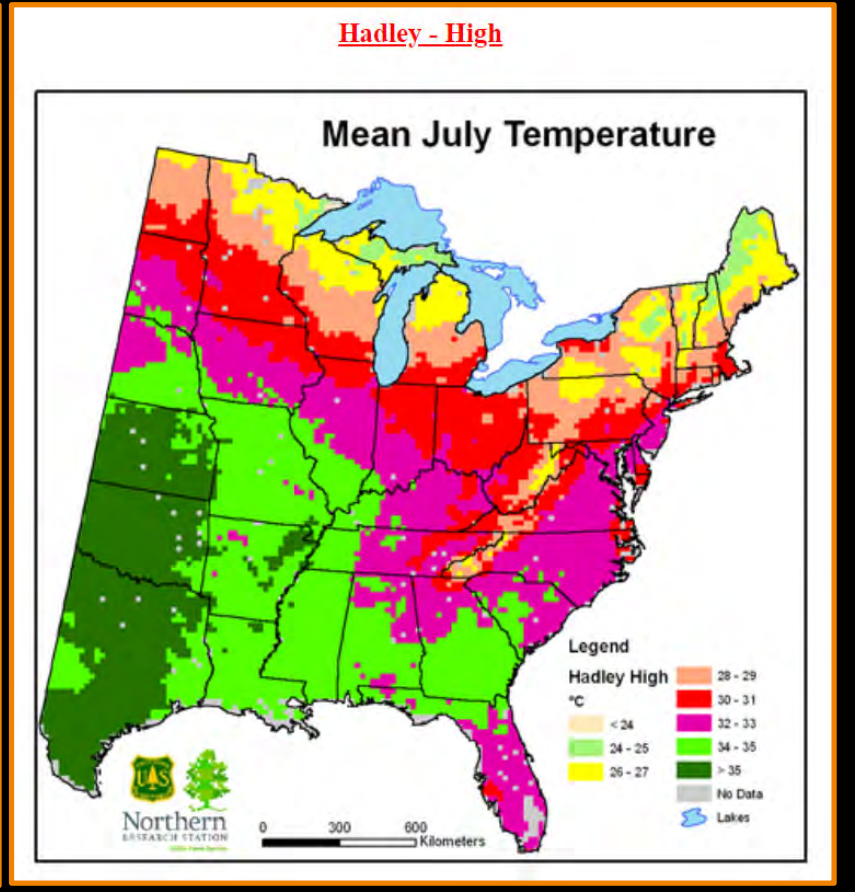
Mean July Temperature

Temperatures by 2100

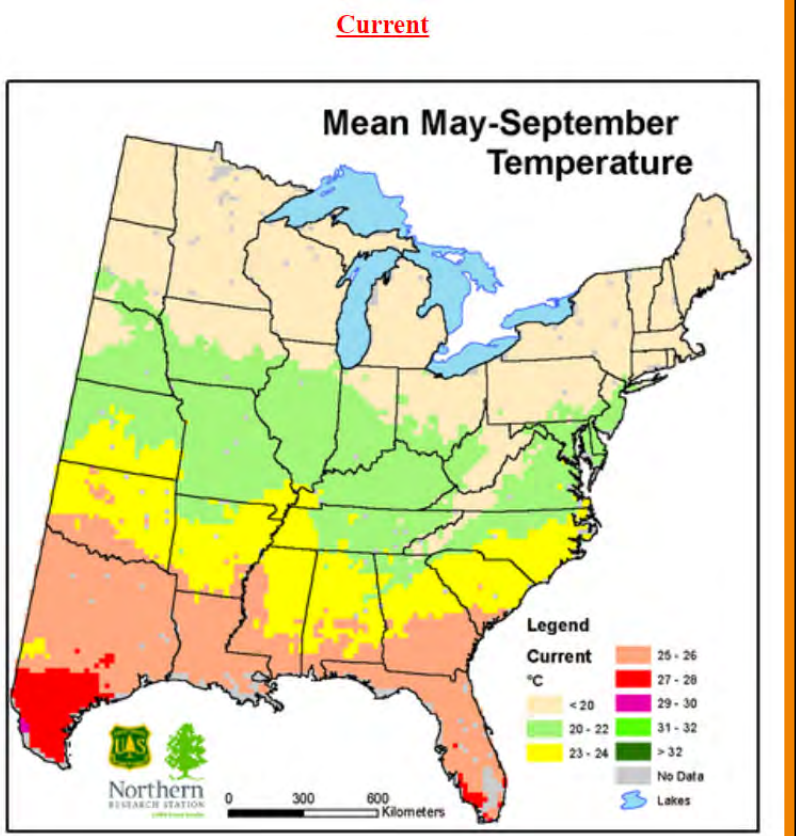
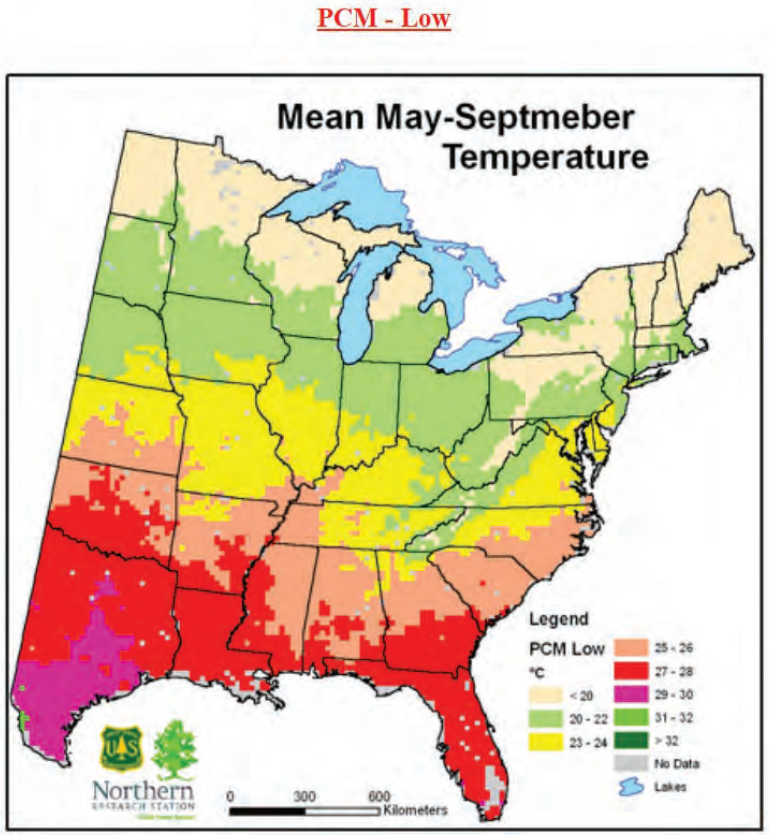
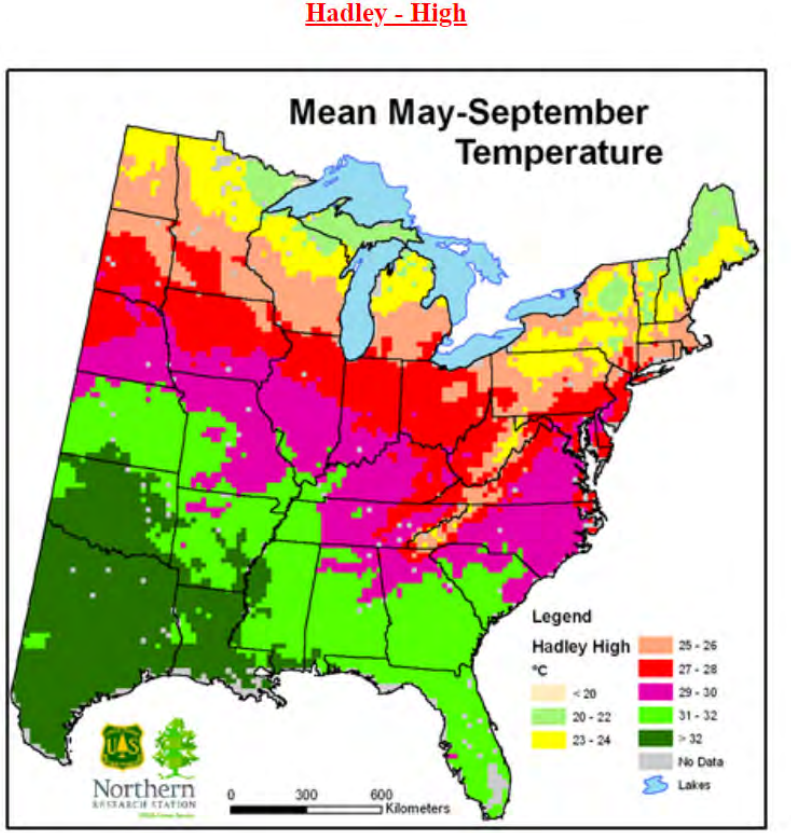
Current (2000)	PCM – Low Emission Scenario	Hadley – High Emission Scenario
		
<24°C (<75.2°F)	24-25°C (75.2-77°F)	30-31°C (86-87.8°F)
	0-2.4% °F	14.4-16.7% °F

https://www.nrs.fs.fed.us/atlas/tree/Predictors.html

HOWARD STEIN HUDSON

Mean May-Sept. Temperature

Temperatures by 2100

Current (2000)	PCM – Low Emission Scenario	Hadley – High Emission Scenario
		
<20°C (<68°F)	20-22°C (68-71.6°F)	25-26°C (77-78.8°F)
	0-5.3% °F	13.2-15.9% °F

https://www.nrs.fs.fed.us/atlas/tree/Predictors.html

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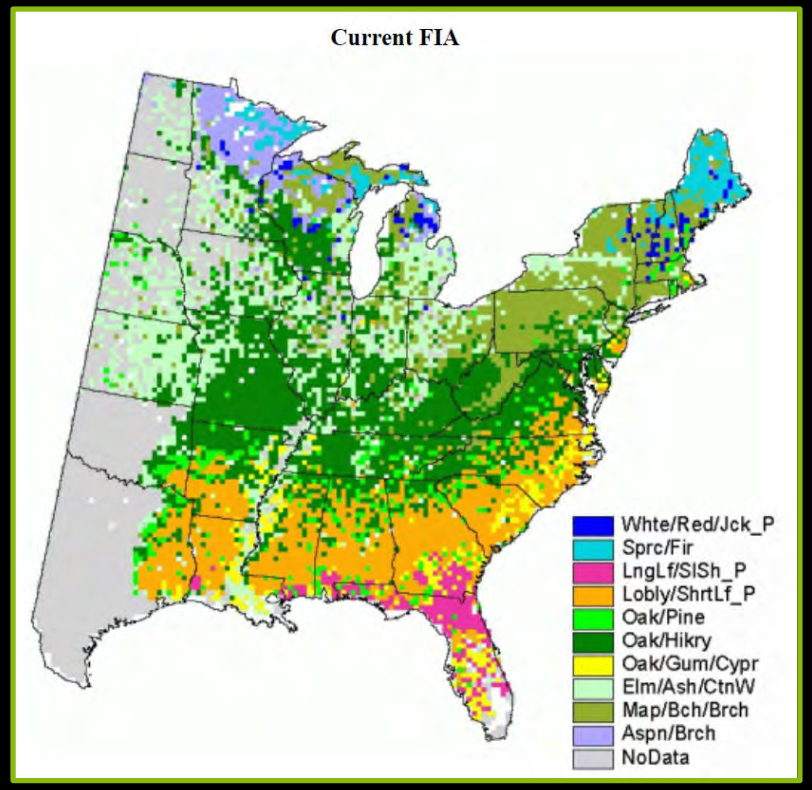
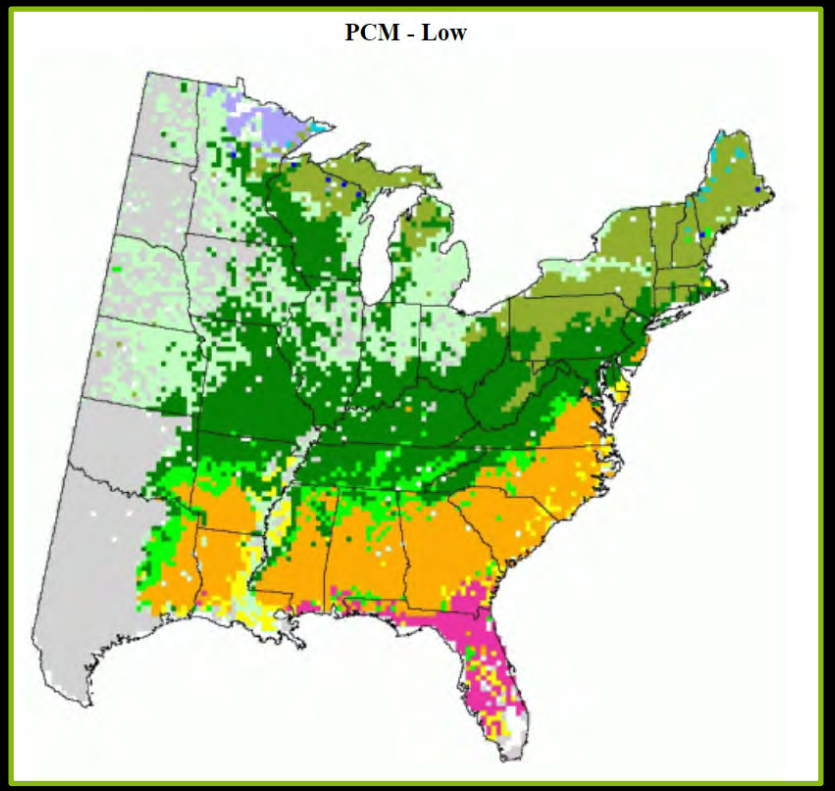
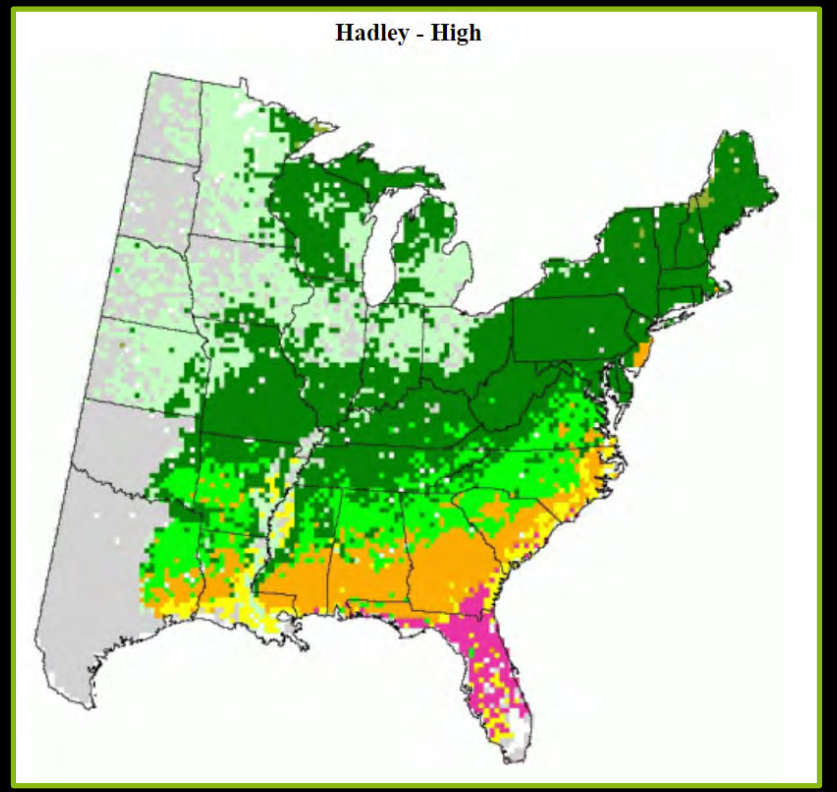
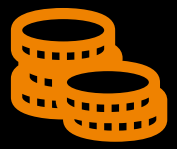
Forrest Type

Changes by 2100: Most Important Species

Current (2000)	PCM – Low Emission Scenario	Hadley – High Emission Scenario
		
Maple/Birch/Beech and Oak/Pine	Maple/Birch/Beech	Oak/Hickory

Prasad, AM; Iverson, LR; Peters, MP; Matthews, SN. 2014. Climate change tree atlas. Northern Research Station, U.S. Forest Service, Delaware, OH. http://www.nrs.fs.fed.us/atlas

Lack of Municipal Resources



1. Operating Funds
2. Capital Funds
3. Staff Time
4. Volunteer Time

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Changing Demographics

Scituate and Massachusetts

Lack of a younger working population sector to boost the local economy:

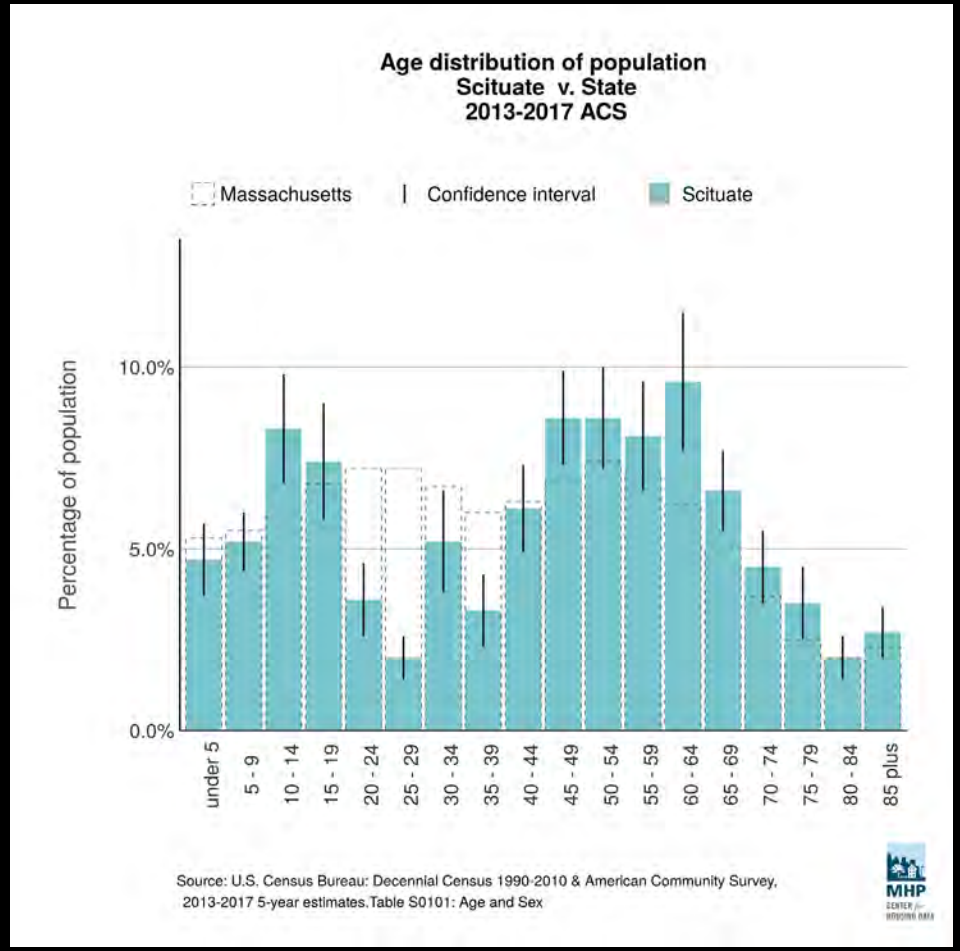
Scituate, MA
18,598 Population (2016)

0 to 19 = 25.6 %
25 to 64 = 51.5 %
65+ = 19.3 %

However:

20 to 24 = 3.6%
25 to 29 = 2.0%

Compared to
60 to 64 = 9.6%



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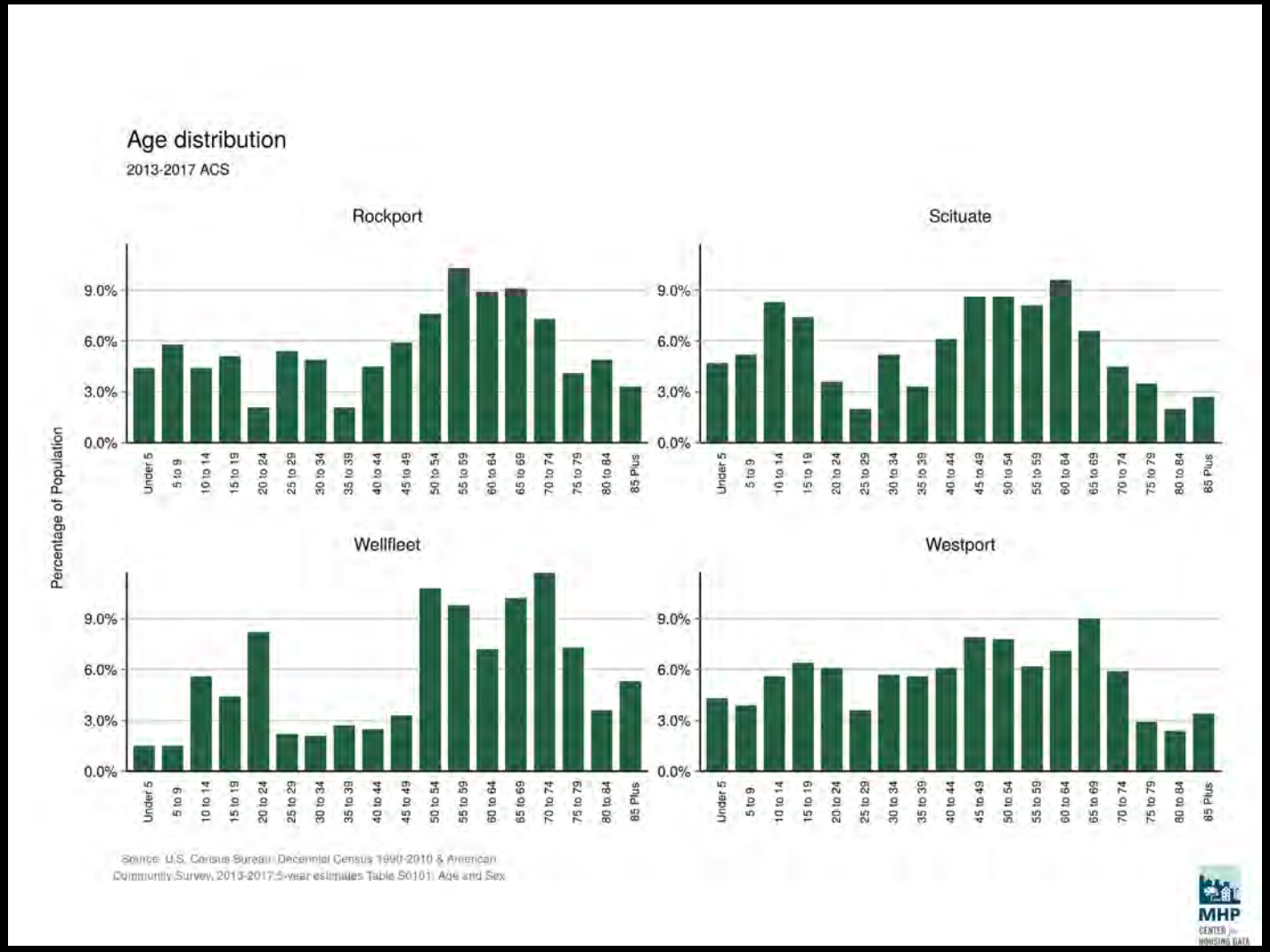
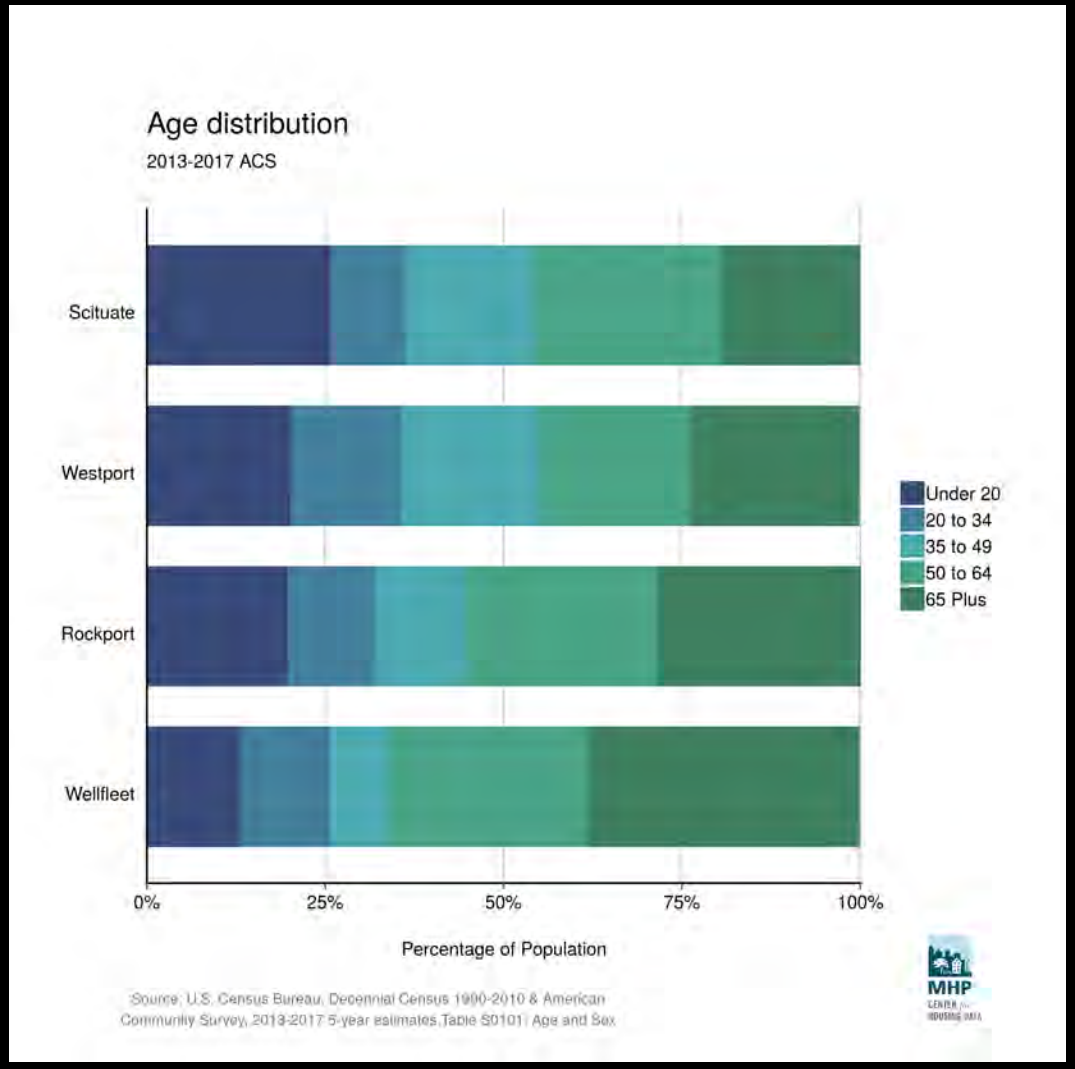
Changing Demographics





Age Distribution Comparison

Source: U.S. Census Bureau

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Changing Demographics

Coastal Communities Comparison

Scituate, MA
18,598 Population (2016)

0 to 19	=	25.6 %
25 to 64	=	51.5 %
65+	=	19.3 %

Rockport, MA
7,209 Population (2016)

0 to 19	=	19.7 %
25 to 64	=	49.6 %
65+	=	28.7 %

Wellfleet, MA
2,754 Population (2016)

0 to 19	=	13.0 %
25 to 64	=	40.6 %
65+	=	38.1 %

Westport, MA
15,854 Population (2016)

0 to 19	=	20.2 %
25 to 64	=	50.0 %
65+	=	23.6 %

Age Distribution Comparison

Source: U.S. Census Bureau

Changes to Demand

Demographic changes and future transformation of Scituate will require accessible, affordable and diverse housing typologies.

Sustainable and resilient growth are critical to the future of the Town.

3. Existing Conditions

What Are Scituate's Assets?

The Ocean

The Harbor

Scituate's Natural Beauty (Beaches and Parks)

Access to MBTA transit

Awareness and readiness from leadership

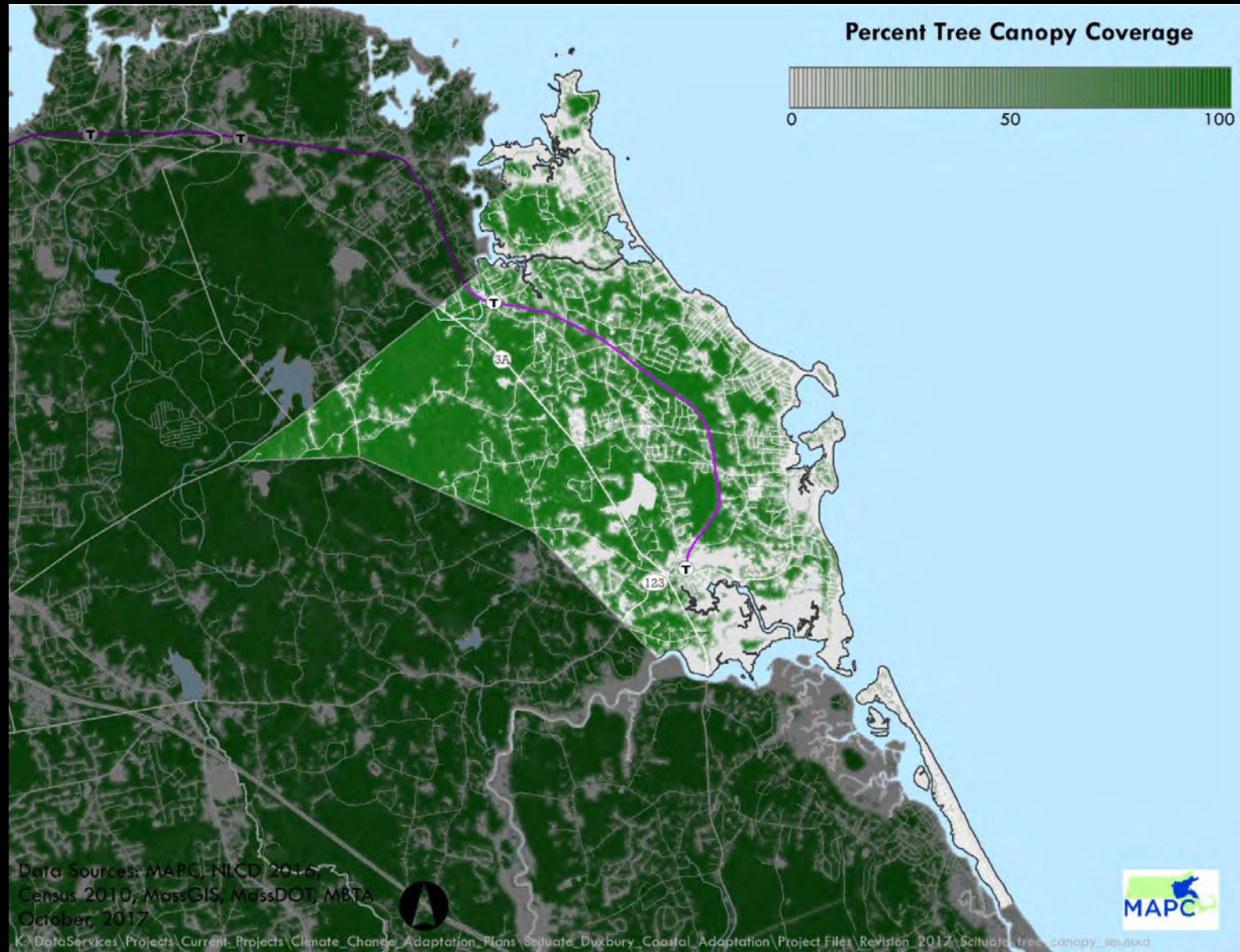
Previous studies and a community awareness help delineate the path to the future sustainable development of the Town of Scituate.

What Are Scituate's Assets?

Considerable areas of green spaces and forestry that help absorb runoff and reduce heat.

Tree canopy cover in Scituate from National Land Cover Database of 2011. 48.8% forest 20.7% open space and recreation land.

Source: MAPC, NLCD 2016



Infrastructure

What Exists?

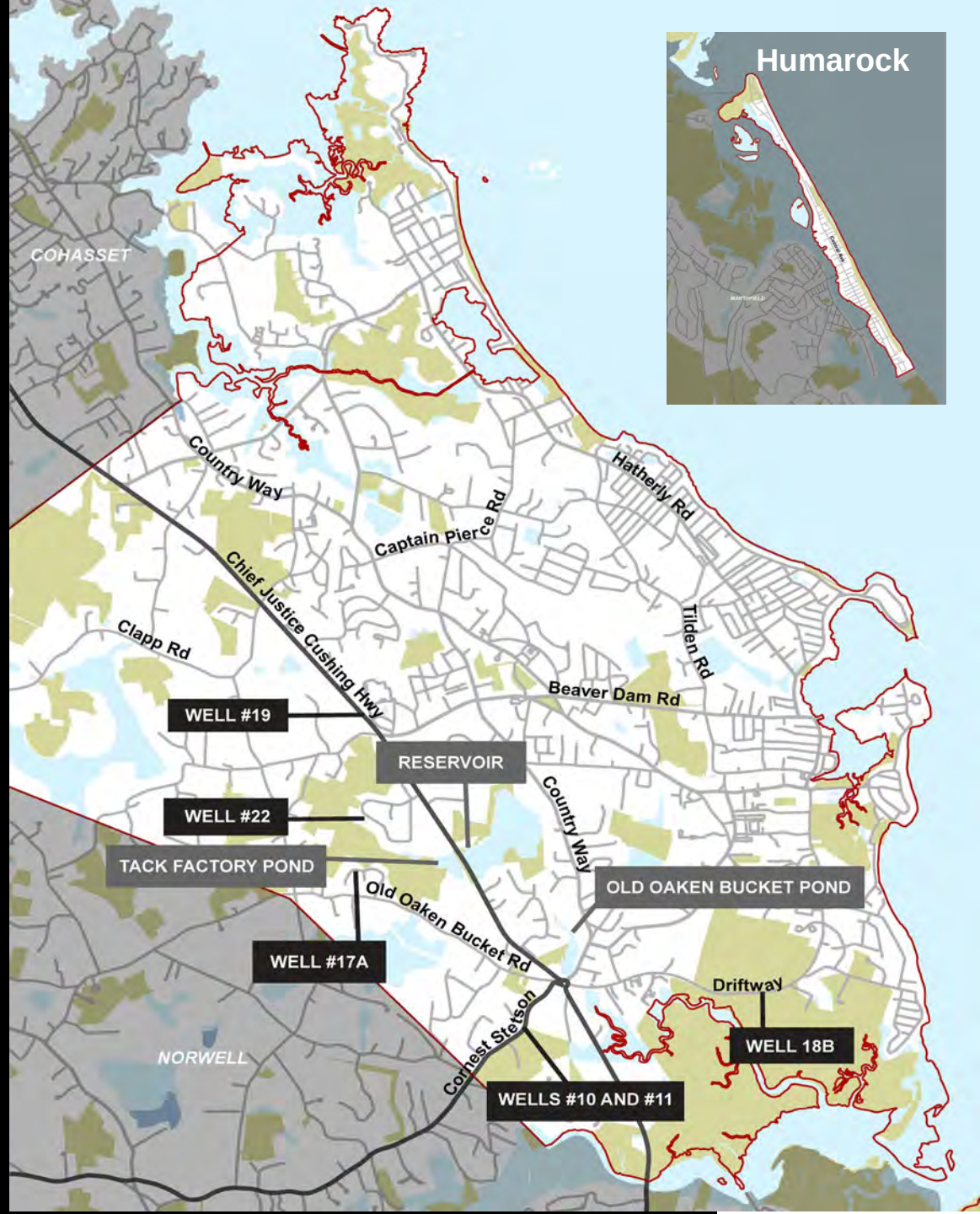
Drinking water sources: groundwater wells and surface water

-Six groundwater wells

-Three reservoirs

-Humarock is served by Marshfield's Water Department

Water withdrawal permit: 1.73 mgd



Infrastructure

What Exists?

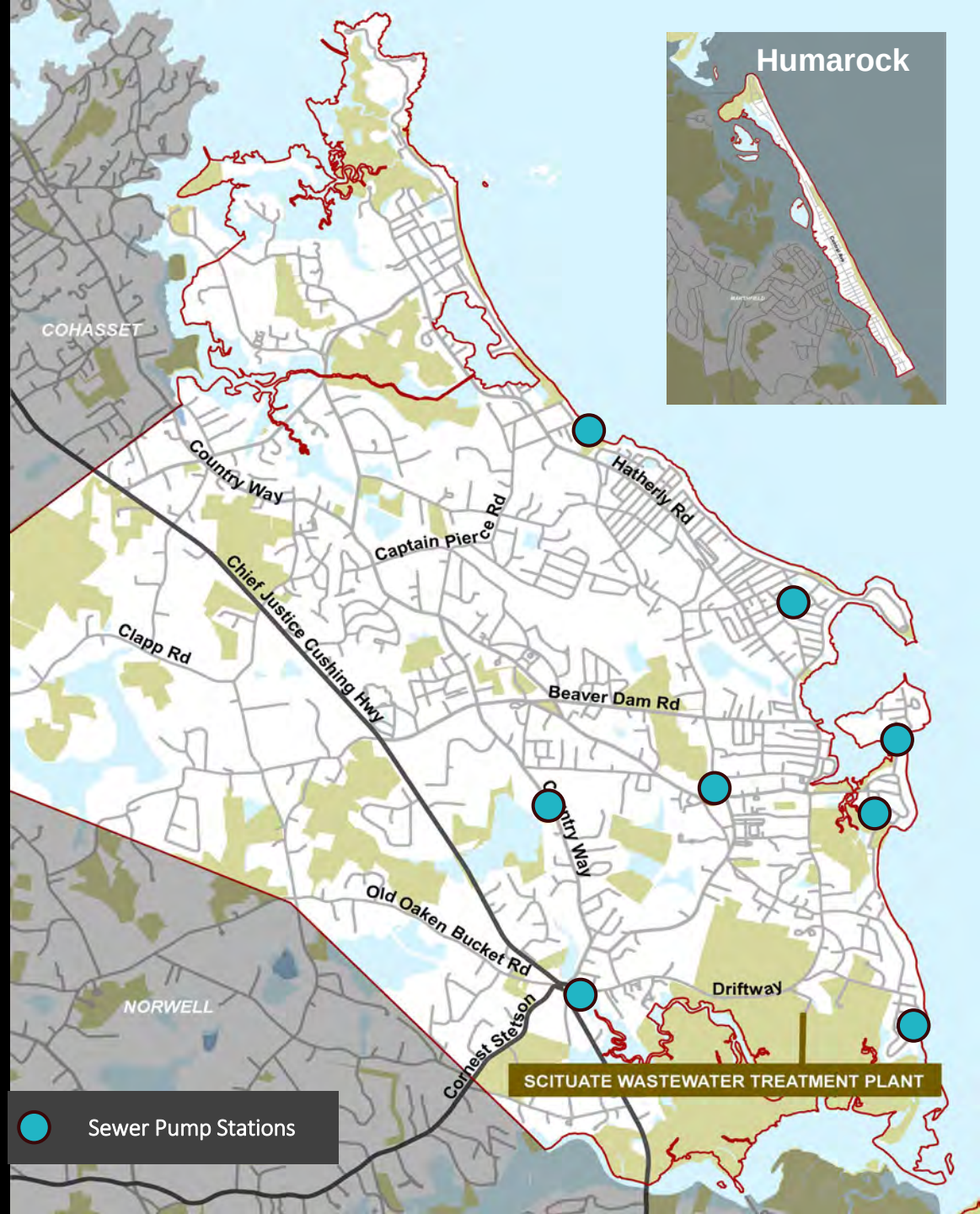
Thirty-two miles of sewer pipe and eight sewer pump stations

Sewage is treated at the Scituate Wastewater Treatment Plant @ 161 Driftway

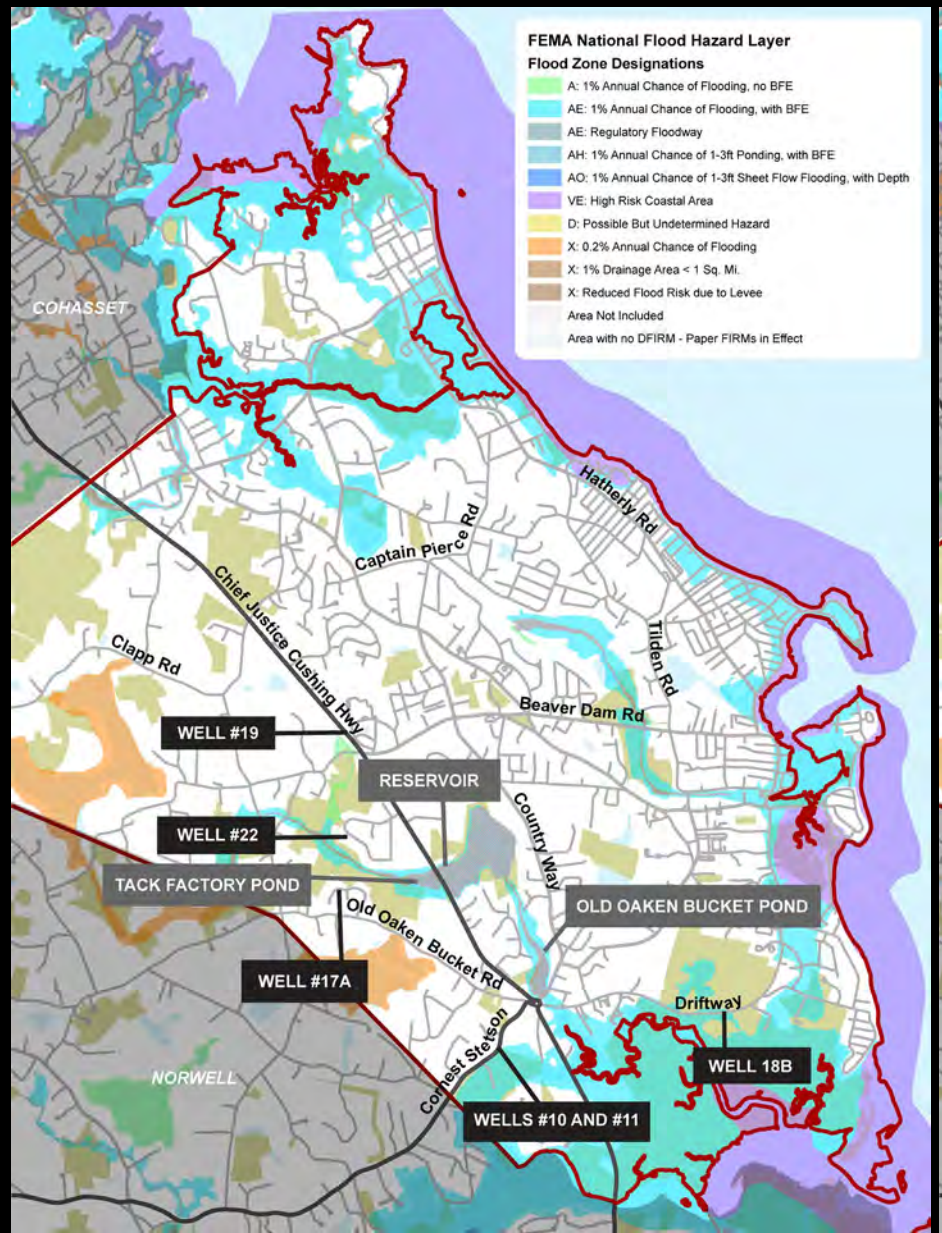
-Within a 1% Annual Chance Flood Zone

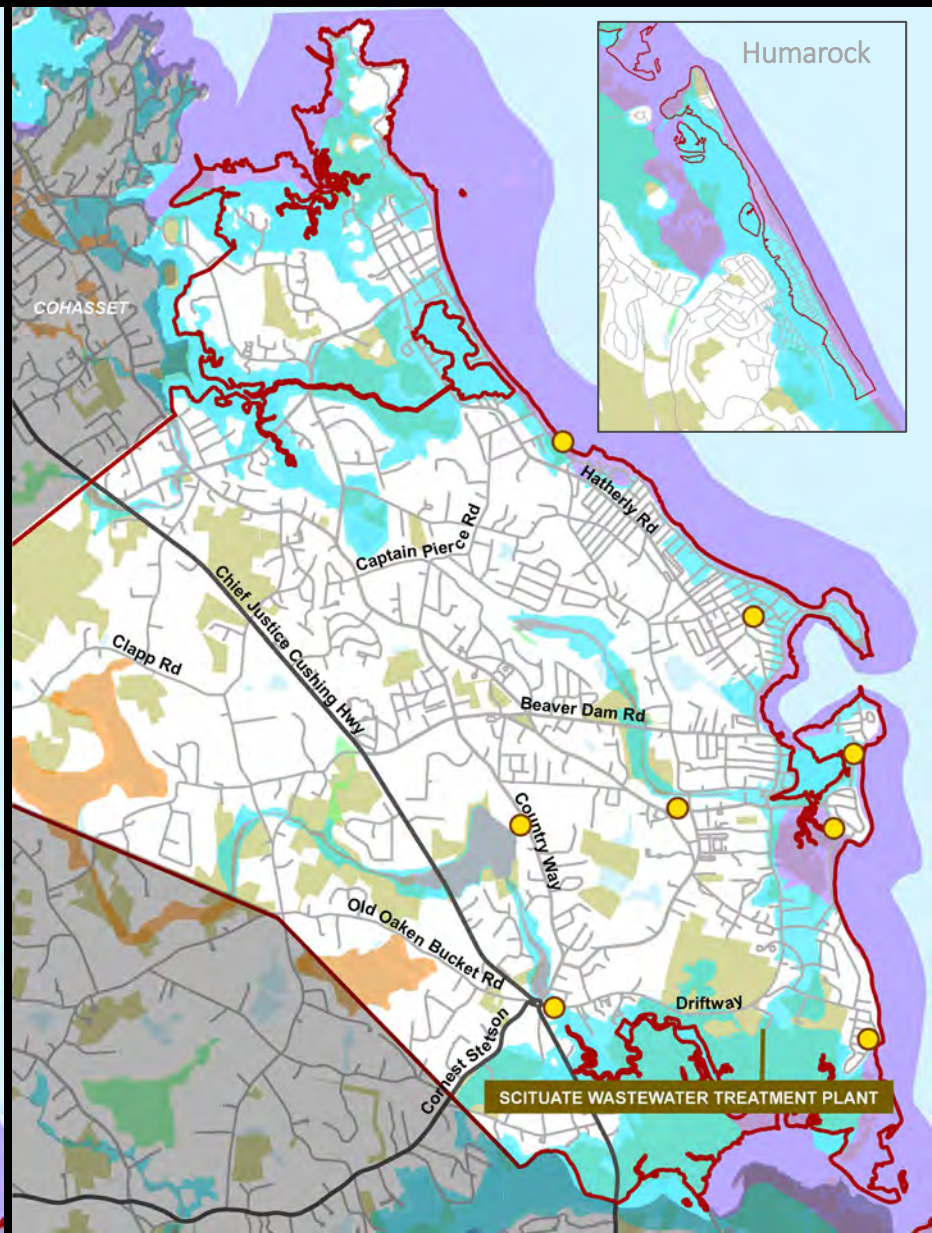
-Current average effluent flow is 1.31 mgd (max daily is 3.9 mgd)

-Upgrade in 2000 – total capacity is now 1.6 mgd

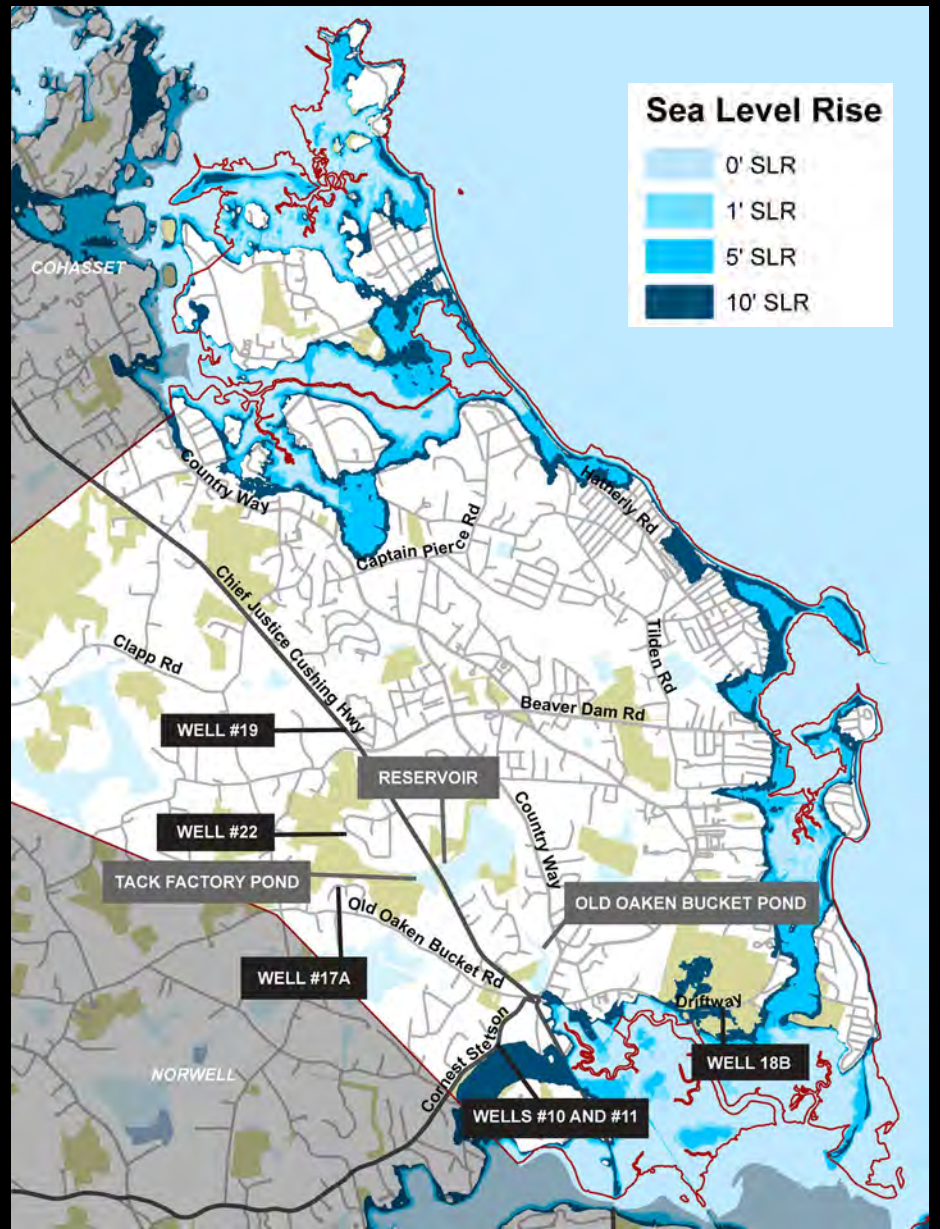


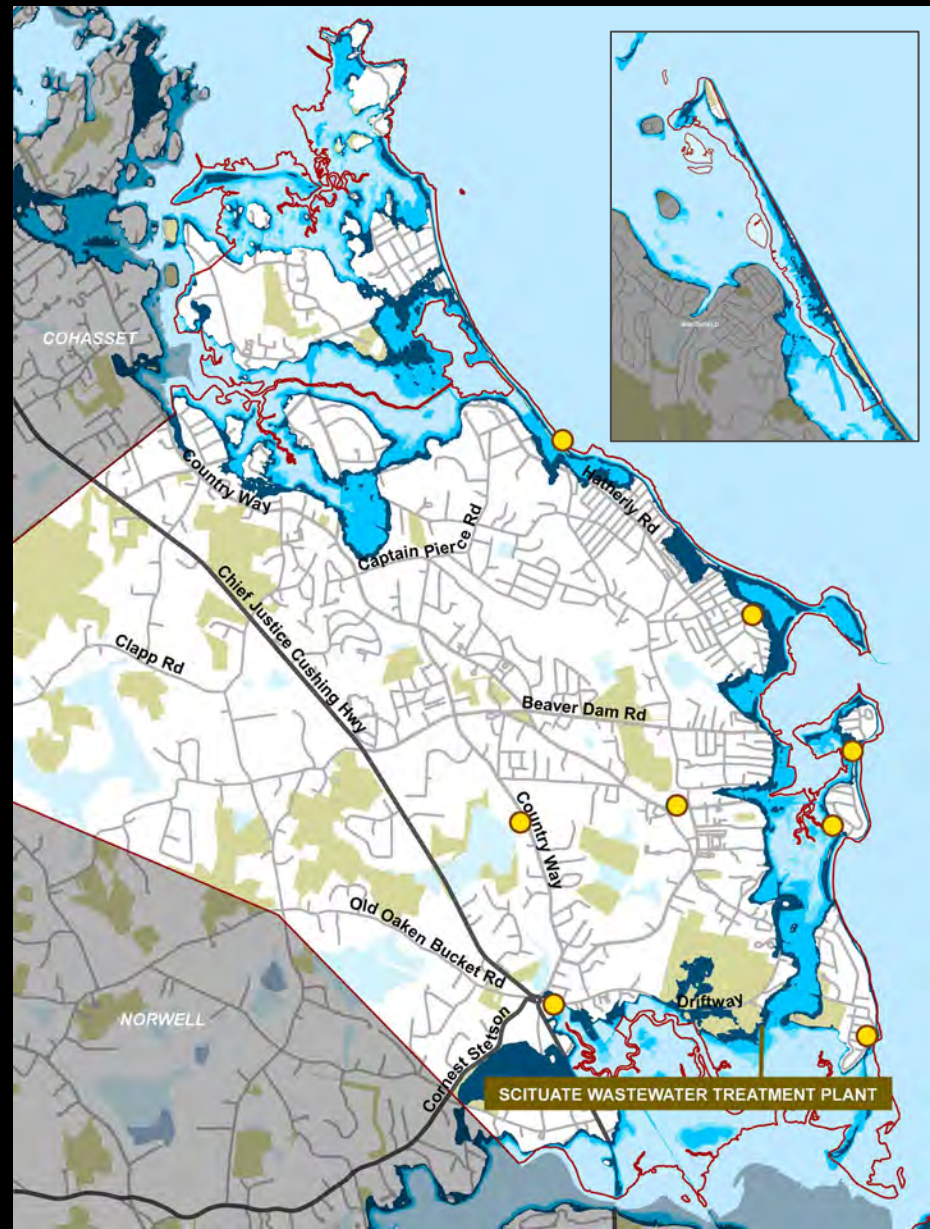
What is Threatened?





What is Threatened?





Water infrastructure

Town will start doing a uni-directional flushing (UDF) program

Water Study (results should be available by January 2020)

Sewer infrastructure

Plan for sewering environmentally sensitive areas and other locations in need of sewer as approved by DEP (six phases)

Town completed up to Phase 3

Three phases remaining in the sewer expansion plan:

Phases	Areas that will be improved
Phase 4	Hatherly Rd, Tilden Rd, Scituate Harbor
Phase 5	North Scituate, Captain Pierce Rd, w. of Country Way Bulrush Farm Rd.
Phase 6	Coastal Areas of Minot Beach and the Glades

Transportation

What Exists?

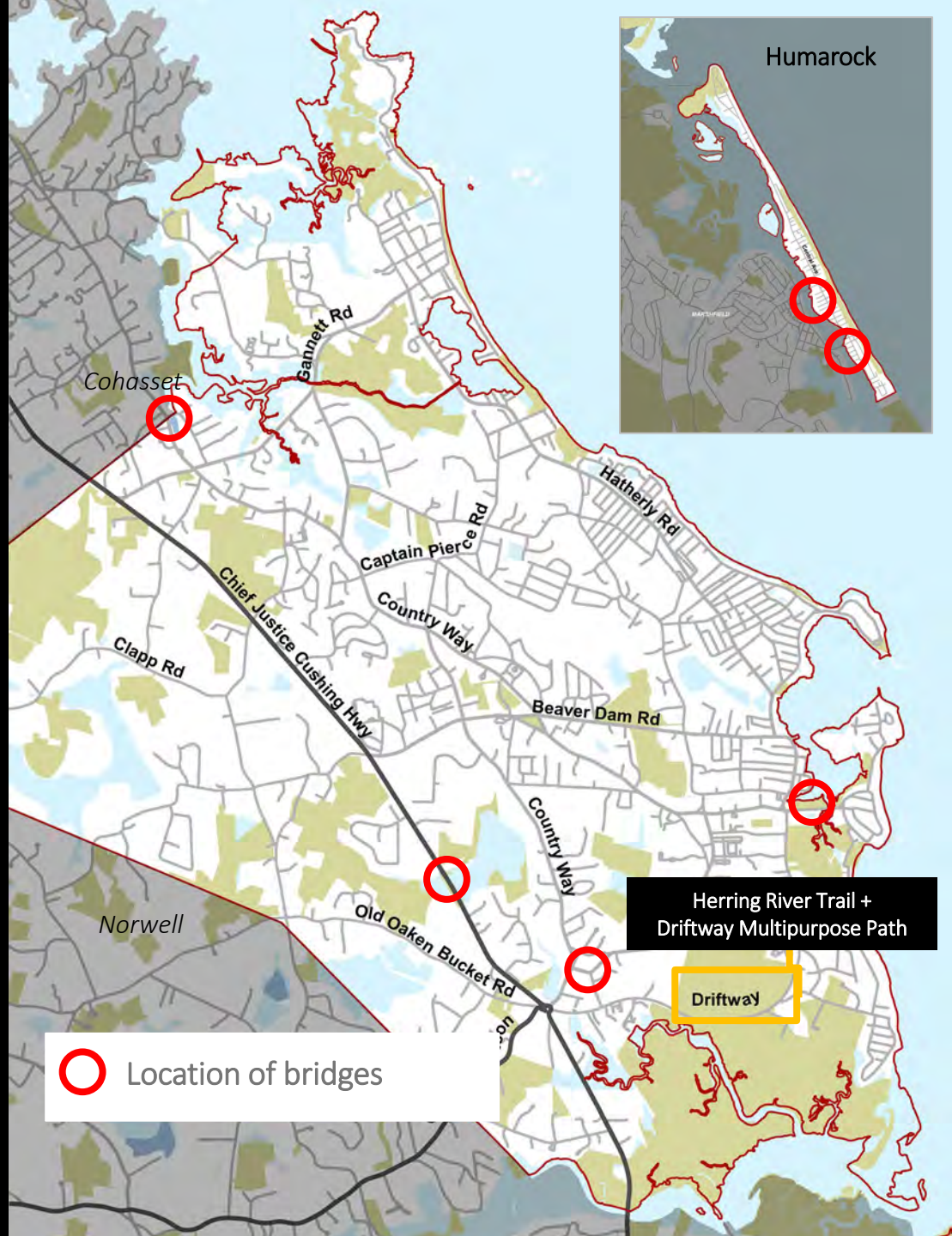
Approximately 30 miles of sidewalk

Six bridges

Trails: *Herring River Trail, Driftway Multipurpose Path*

114 miles of road

Approximately 108K ft. of pipes, 10,000 manholes, 90 culverts



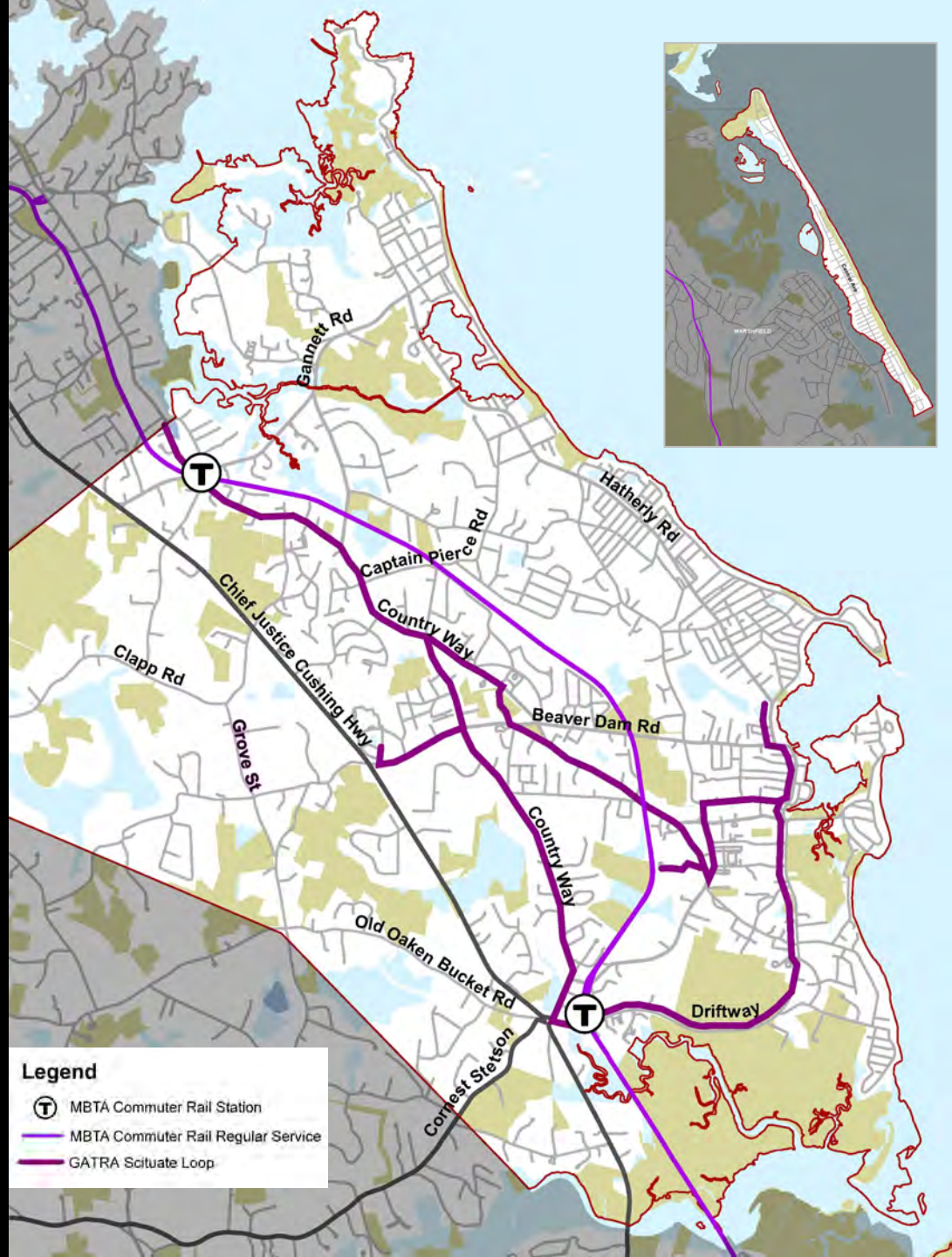
Transportation

What Exists?

MBTA Commuter Rail Lines

- **Greenbush Station**
- **North Scituate Station**

GATRA (Greater Attleboro Taunton Regional Transit Authority) Scituate Loop



What is Threatened?

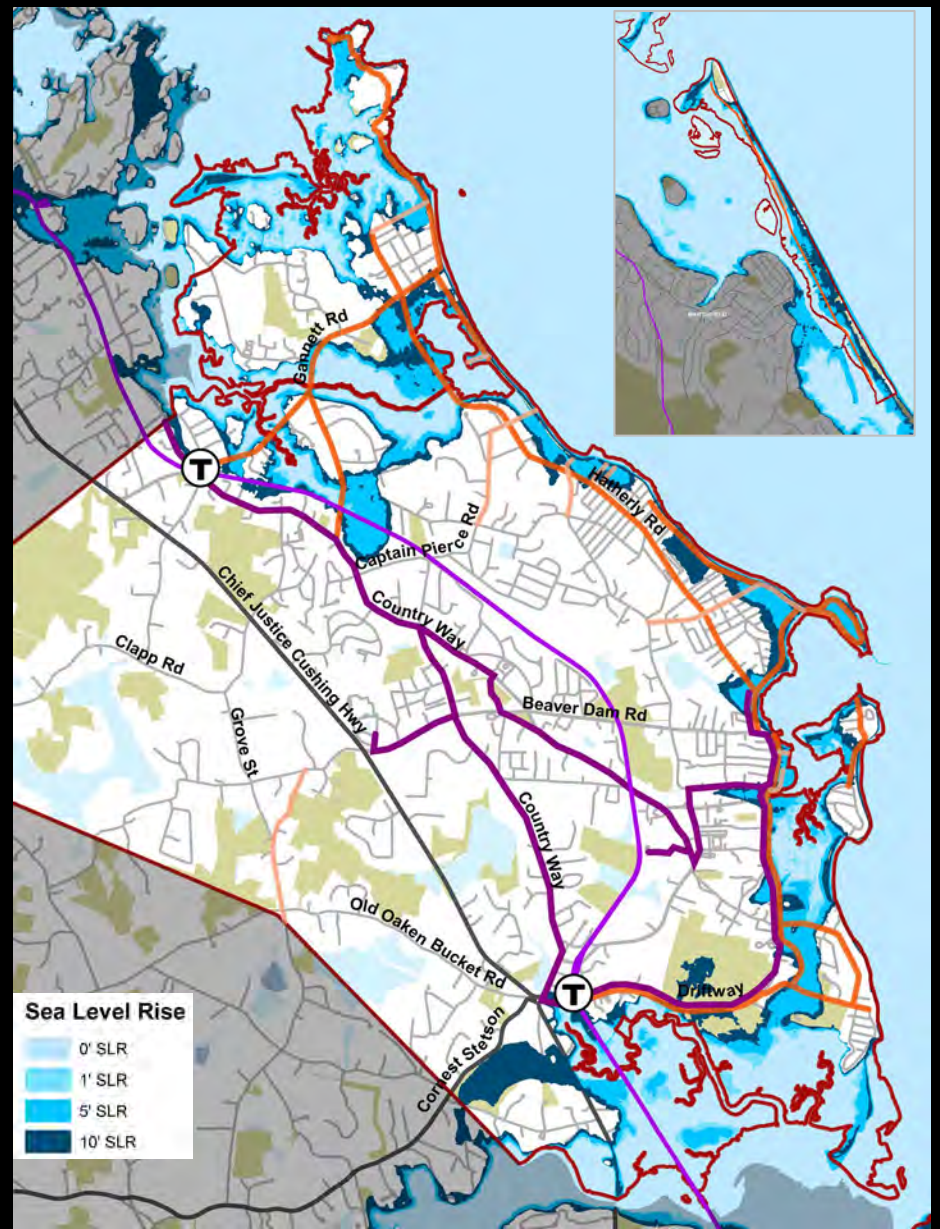
The kind of impact climate change would have on roadways is its increased deterioration of its component

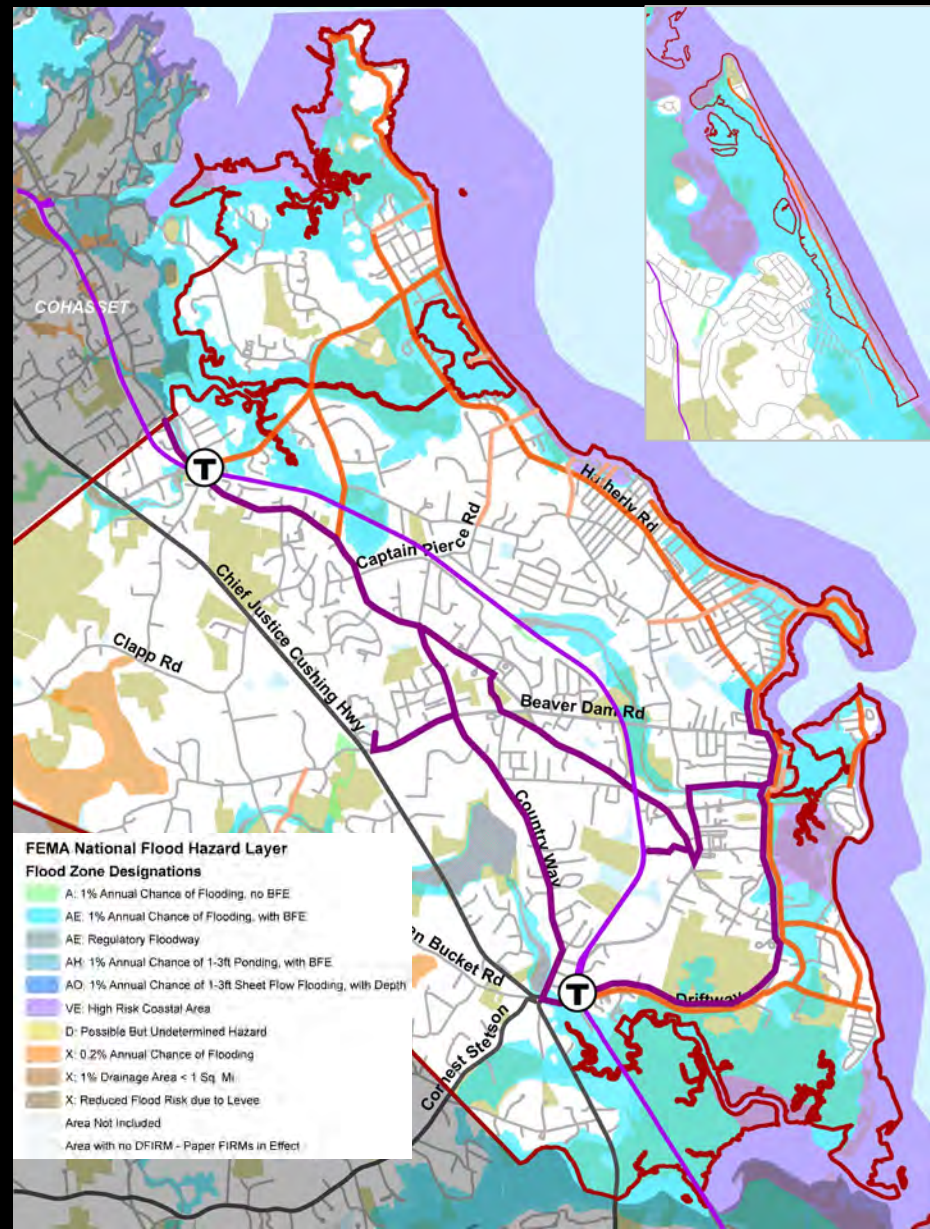
- **Extreme temperatures would stress roadway infrastructure**
- **Flooding has the potential to block roadways for both regular and emergency transportation access**

MBTA Commuter Rail Station threats:

- **Both located within a 1% Annual Chance Flood Zone, including rail lines**
- **Both are low-lying and generally prone to flooding today**
- **Greenbush Station is located within an existing urban heat island**

What is Threatened?





4. Recommendations

Drinking Water
Protect current sources
Explore new sources
Reduce consumption
Extend service to North Scituate
Increase water withdrawal permit

Built environment
Identify critical infrastructure to protect
Revise zoning to reduce development impact
Protect natural resources
Protect and adjust existing infrastructure to mitigate sea level rise and climate change - (i.e. Elevate and enhance drainage, roads, bridges, and/or flood prevention structures to facilitate ingress and egress during storm events)

Transportation
Protect and adjust existing emergency communication roads, rails to mitigate sea level rise and climate change
Promote alternative modes of mobility to reduce car dependency - (i.e. Complete Streets Infrastructure)

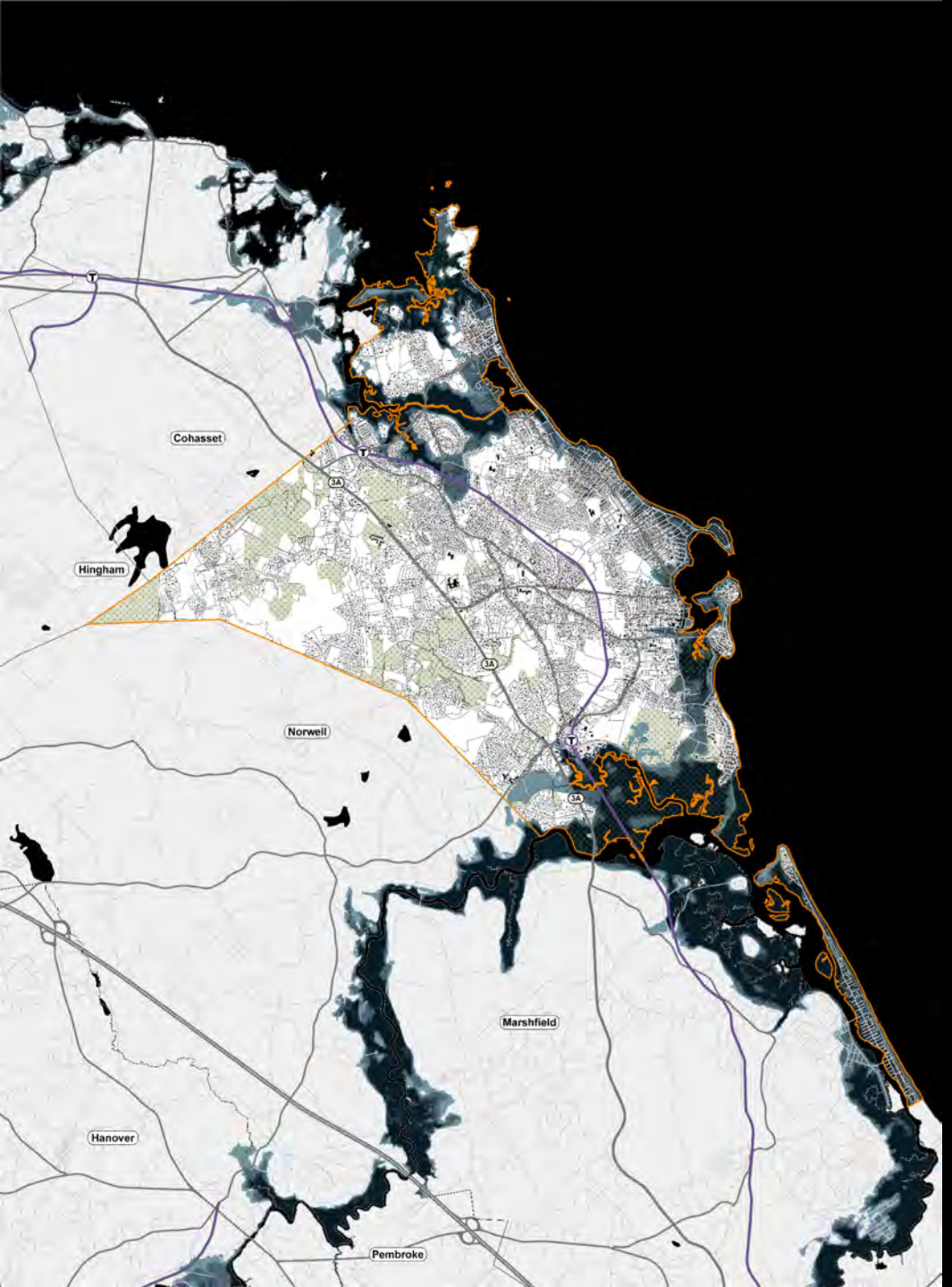
Natural Resources
Protect wetlands
Salt Marsh restoration
Protect the coast and harbor
Use of green space as resilient sites while serving as public amenities/attractions
Protect the forestry

Wastewater / Sewer
Protect systems from flooding
Upgrade aging infrastructure
Prioritize investment
Establish evacuation routes
Complete Sewage Expansion Plan (North Scituate area is priority)

People
Affordable and resilient housing as shelter
Healthy low impact housing
Emergency Response Centers and Organizations
Encourage a younger productive demographics

Energy
Green energy implementation for new and existing development
Protect existing infrastructure

Economy
Improve the Town's Tax Base
Develop North Scituate for new business and housing opportunities
Engage the business sector into planning
Support local business owners in maintaining vibrant, attractive, and functional retail centers



5. Interactive Sessions

Mapping Assets

Did we miss some of Scituate's assets that are under threat?

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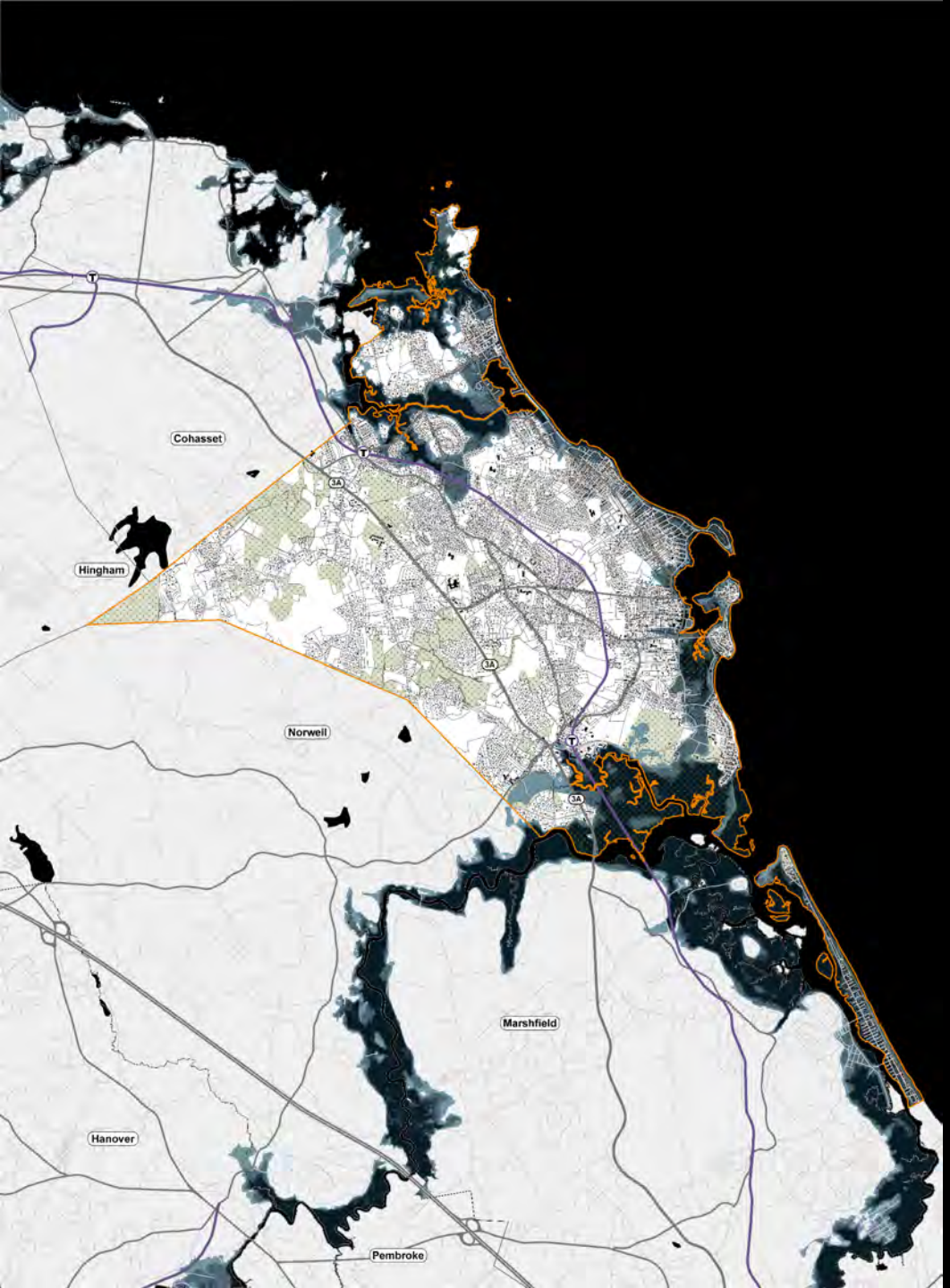

5. Interactive Sessions

Prioritizing

What threatened assets
are a priority in Scituate?

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6. Next Steps

September – December

Master Plan Committee Meetings

Research and Analysis

November 12 – Community Forum #3 (A Changing Community)

December 10 – Community Forum #4 (Managing Change)

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Town of Scituate

Comprehensive Master Plan Update

Community Forum #2

October 22, 2019

Resiliency Workshop