Sustainability Matters: Community Unity

3 CEU Course approved by the Maine RE Commission

Brian Ambrette

Senior Climate Resilience Coordinator, Maine Governor’s Office of Political Innovation and the Future (GOPIF)

GOVERNOR'S OFFICE OF

Policy Innovation and the Future

Brian Ambrette
Senior Climate Resilience Coordinator

Greater Portland Board of Realtors - April 27, 2023

The New York Times

Monday, August 9, 2021 PLAY THE CROSSWORD

A Hotter Future Is Certain, Climate Panel Warns. But How Hot Is Up to Us.

- Nations have delayed curbing emissions for so long that global warming will inevitably intensify over the next 30 years, a major U.N. report found.
- There is a short window to avoid the most harrowing future, the report said. Doing so would require a coordinated international effort starting immediately.

David Swanson/Reuters

A FOUR-YEAR PLAN FOR CLIMATE ACTION
MAINE
WON'T WAIT
DECEMBER 2020
MAINE CLIMATE COUNCIL

[Credit: Peter John Maridable | Unsplash]

> “Unless there are immediate, rapid, and large-scale reductions in greenhouse gas emissions, limiting warming to 1.5°C will be beyond reach.

ipcc
INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

"I pledge that my Administration will work to prevent and mitigate climate change at every turn, helping communities become resilient to those changes already underway and embracing clean energy opportunities to create jobs and wean our state off fossil fuels. We will lead in this effort to ensure that our children and grandchildren will enjoy, as we do, Maine's unsurpassed bounty and beauty."

—Governor Janet T. Mills

CLIMATE COUNCIL GOALS

12.01.20
Climate Action Plan Delivered

ACHIEVE STATE CARBON NEUTRALITY BY
2045

REDUCE MAINE'S GREENHOUSE GAS EMISSIONS BY TARGETS OUTLINED IN STATE LAW

45%
BELOW 1990 LEVELS BY 2030

80%
BELOW 1990 LEVELS BY 2050

ENSURE MAINE PEOPLE, INDUSTRIES, AND COMMUNITIES ARE RESILIENT TO THE IMPACTS OF CLIMATE CHANGE.

Overview

1) *Maine Won't Wait* - Progress tracking and dashboard

2) Community Resilience Partnership grant program

3) State "Lead by Example" activities

4) Federal support in Maine
   - MJRP – Maine Jobs & Recovery Plan
   - BIL – Bipartisan Infrastructure Law
   - IRA – Inflation Reduction Act

Maine's 8 Climate Action Strategies

A. Embrace the Future of Transportation in Maine

D. Grow Maine's Clean Energy Economy and Good Jobs

G. Invest in Climate-Ready Infrastructure

B. Modernize Maine's Buildings

E. Protect Maine's Environment and Working Lands and Waters, Increase Carbon Sequestration

H. Engage People and Communities in Climate Impacts and Program Opportunities

C. Reduce Carbon Emissions the Energy and Industrial Sectors through Clean Energy Innovation

F. Build Healthy and Resilient Communities

Tracking the Progress of *Maine Won't Wait*

This dashboard tracks numerical targets included in *Maine Won't Wait* to inform the public and help evaluate whether evidence-based adjustments, enhancements or replacements to policies are needed in pursuit of the plan's climate objectives. Over time, the dashboard will expand to include other key *Maine Won't Wait* metrics as updated data becomes available, new programs are established, and state and federal climate investments are realized.

8,594
Electric & Plug-in Hybrid Vehicles

Goal: 219,000 by 2030

389
Public EV Charging Stations

Up from 184 in 2019

82,326
New Heat Pumps since 2019

Goal: 100,000 new by 2025

9,112
Homes Weatherized since 2019

Goal: 17,500 by 2025

48%
Clean Energy Use

Goal: 80% by 2030

14,477
Clean Energy Jobs

Goal: 30,000 by 2030

22%
of Maine Land Conserved

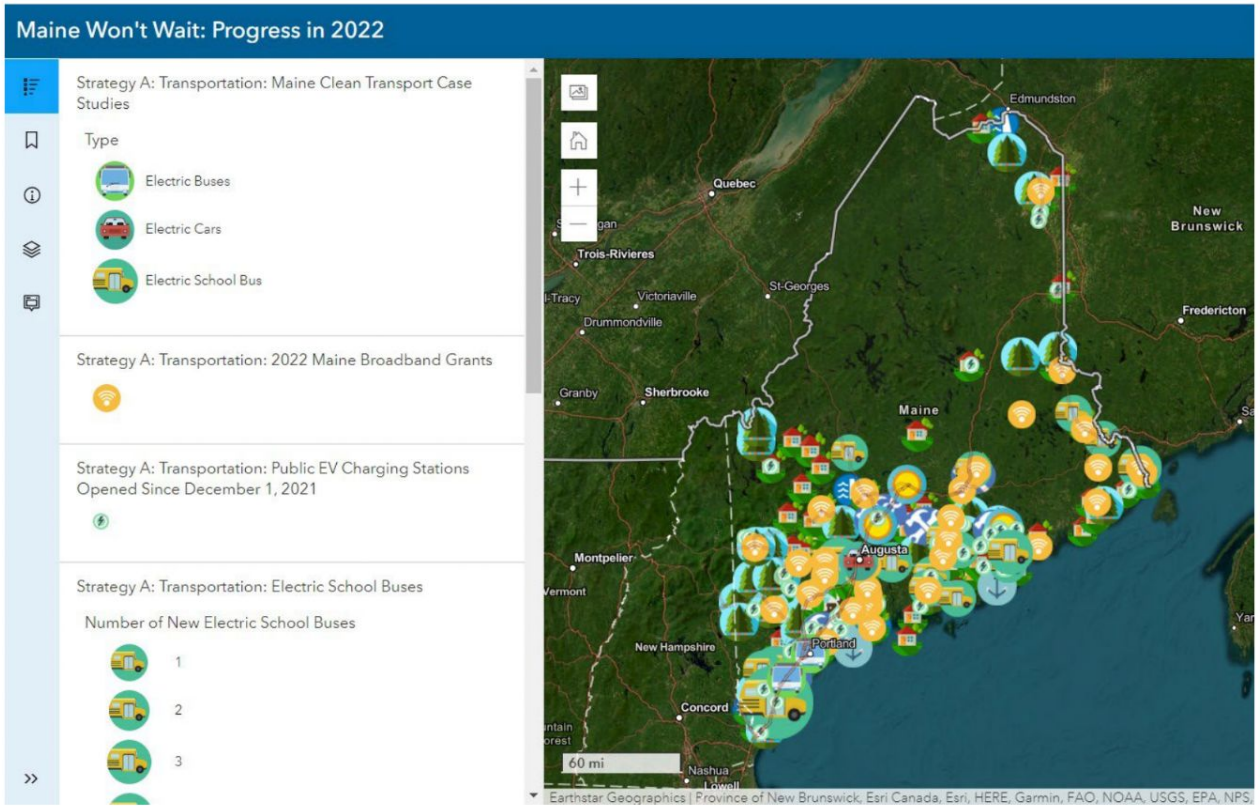
Goal: 30% by 2030

127
Communities in Resilience Partnership

Goal: 100 Communities by 2023

Visit our online dashboard to learn more: maine.gov/climateplan/dashboard

maine.gov/climateplan/dashboard



25%

Below 1990 Greenhouse Gas Emissions

Updated Figure for 2019

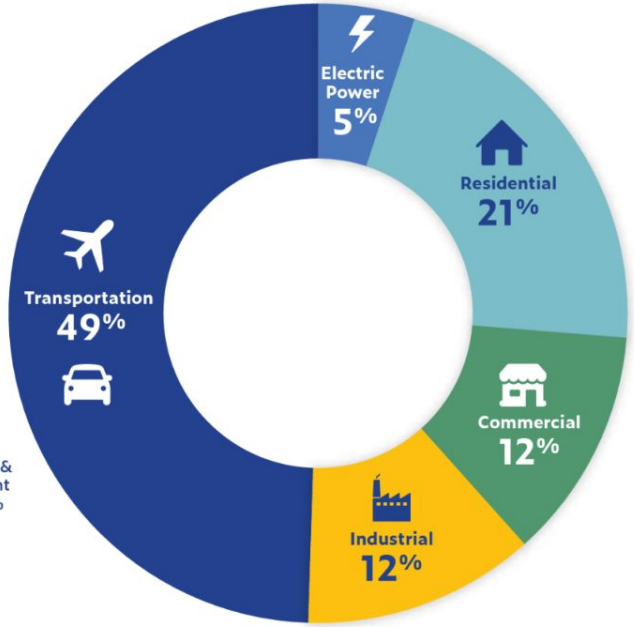
75%

of the way to Carbon Neutral

Goal: 100% Carbon Neutral by 2045

(75% of Maine GHG emissions absorbed by Maine ecosystems)

Maine Carbon Dioxide Emissions from Fossil Fuel Combustion by Sector (2019)



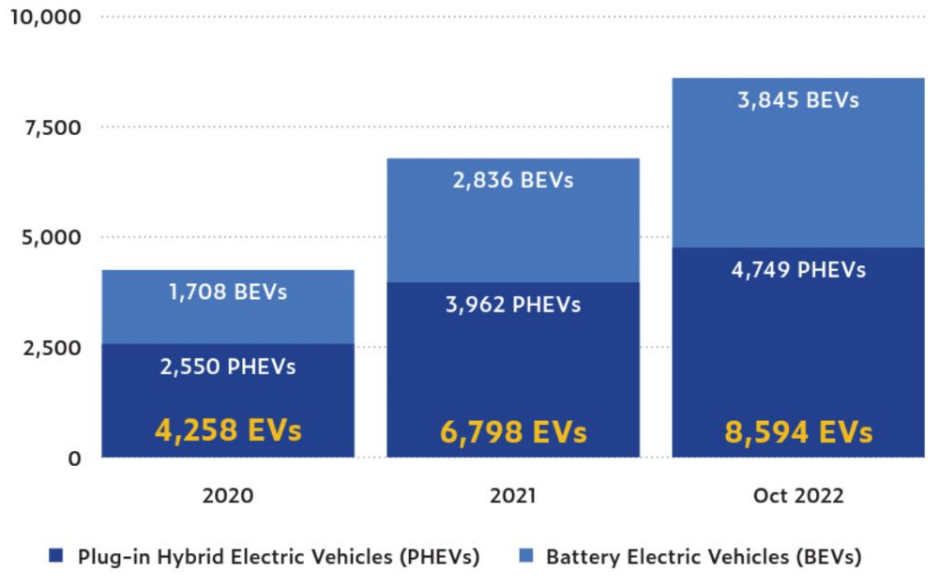
Internation shipping & aviation fuels account for an additional 1% of emmissions

Data source:
Maine Department of Environmental Protection

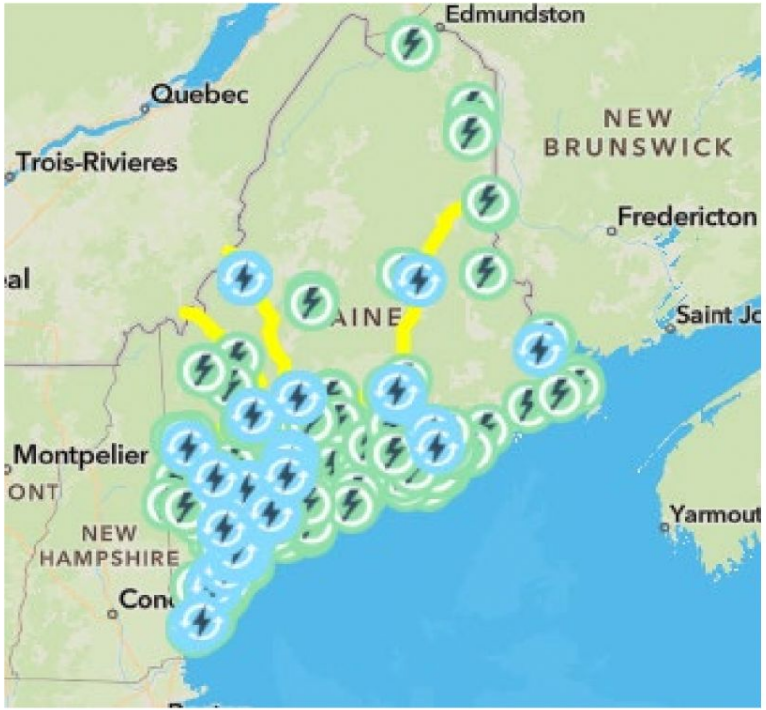
A FOUR-YEAR PLAN FOR CLIMATE ACTION
MAINE WON'T WAIT
DECEMBER 2020
MAINE CLIMATE COUNCIL

Electric Vehicles: growth with new federal opportunities coming

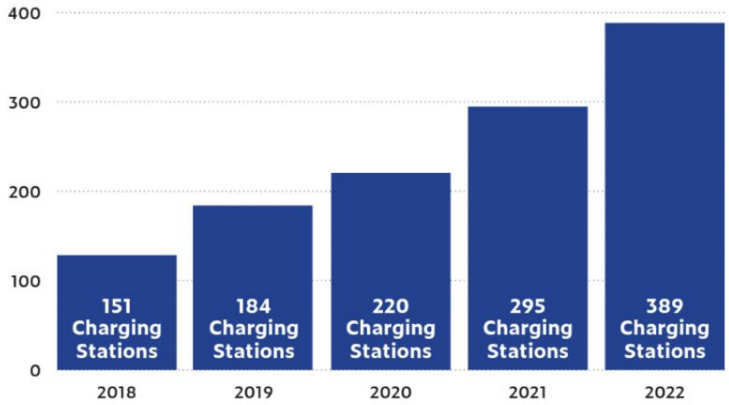
Electric Vehicles on the Road in Maine



Accelerating EV Charging Deployment



Maine Public EV Charging Stations

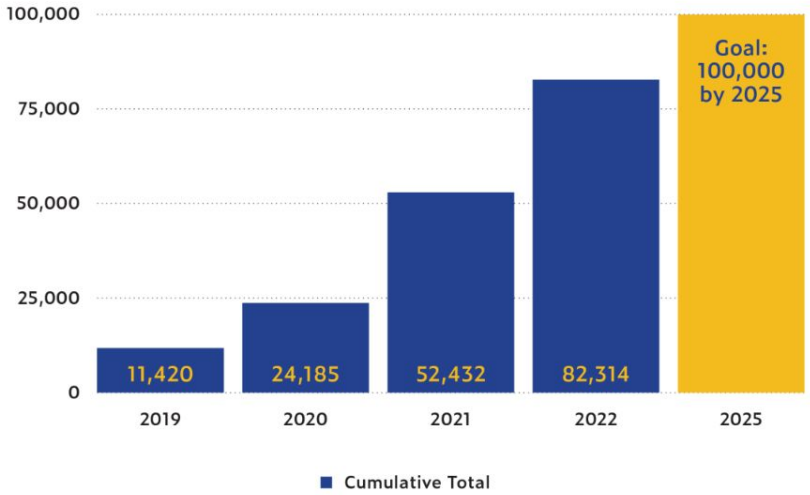


Data source: NREL Alternative Fuels Data Center, Alternative Fueling Station Counts by State

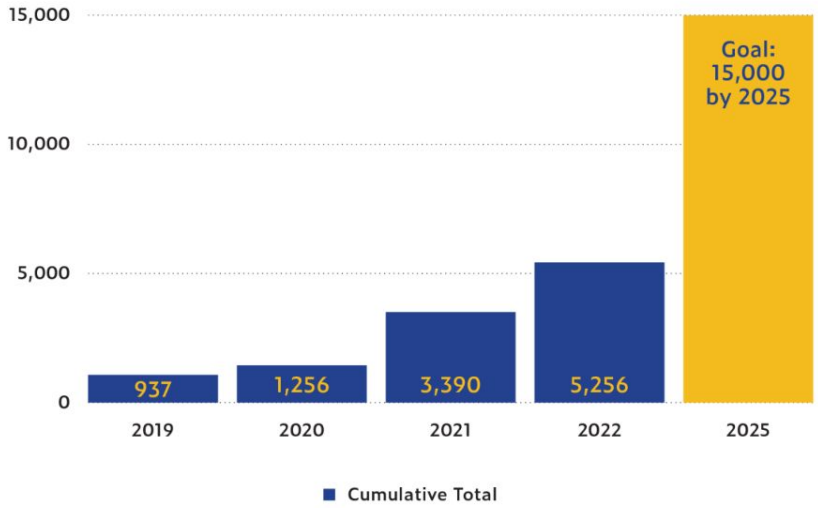
A FOUR-YEAR PLAN FOR CLIMATE ACTION
MAINE
WON'T WAIT
DECEMBER 2020
MAINE CLIMATE COUNCIL

Nation-Leading Heat Pump Deployment

New Heat Pumps



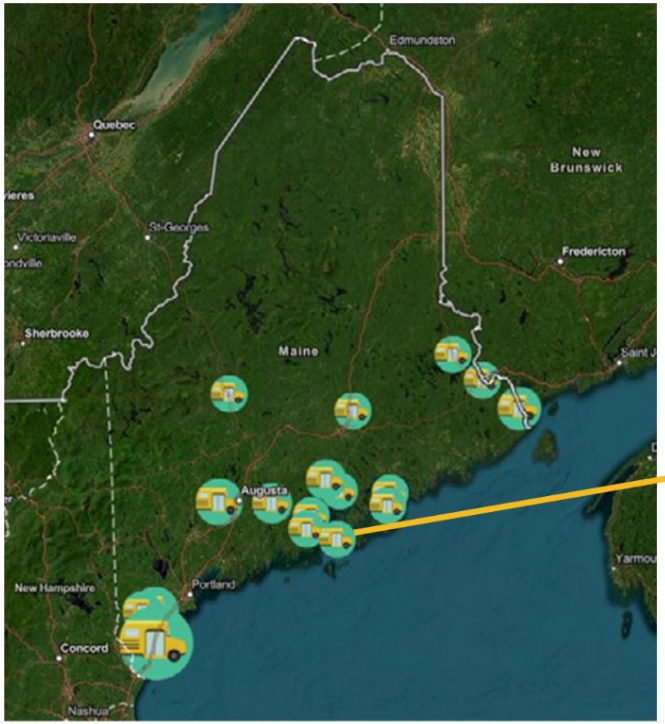
New Heat Pumps: Low-Income



A FOUR-YEAR PLAN FOR CLIMATE ACTION
MAINE WON'T WAIT
DECEMBER 2020
MAINE CLIMATE COUNCIL

Wins for Maine from EPA Clean School Bus Program

34 EV buses for Maine, #4 in the country per capita for bus awards

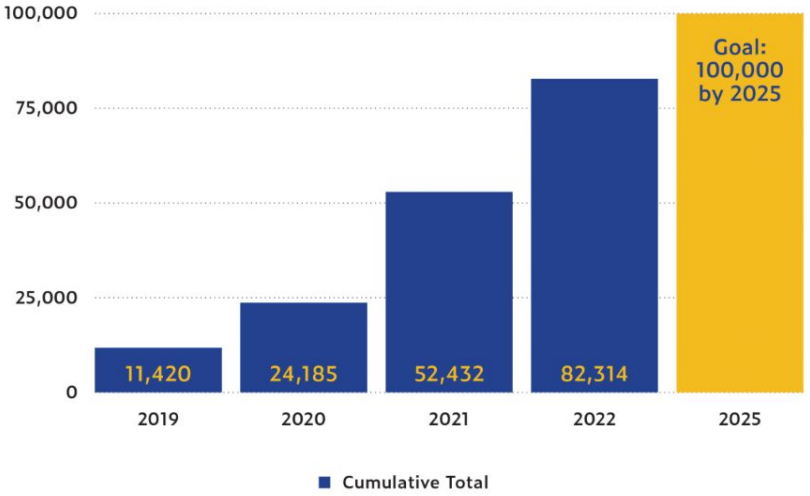


Mount Desert Island High School electric school bus, Maine's first!

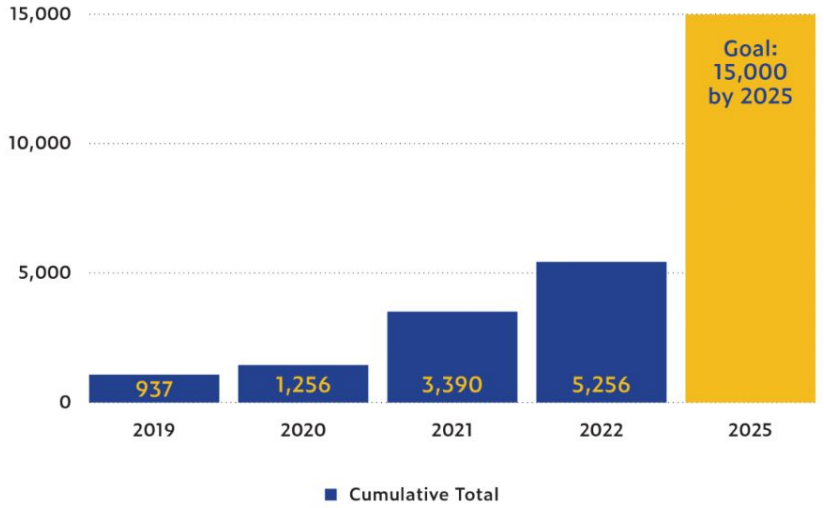
A FOUR-YEAR PLAN FOR CLIMATE ACTION
MAINE WON'T WAIT
DECEMBER 2020
MAINE CLIMATE COUNCIL

Nation-Leading Heat Pump Deployment

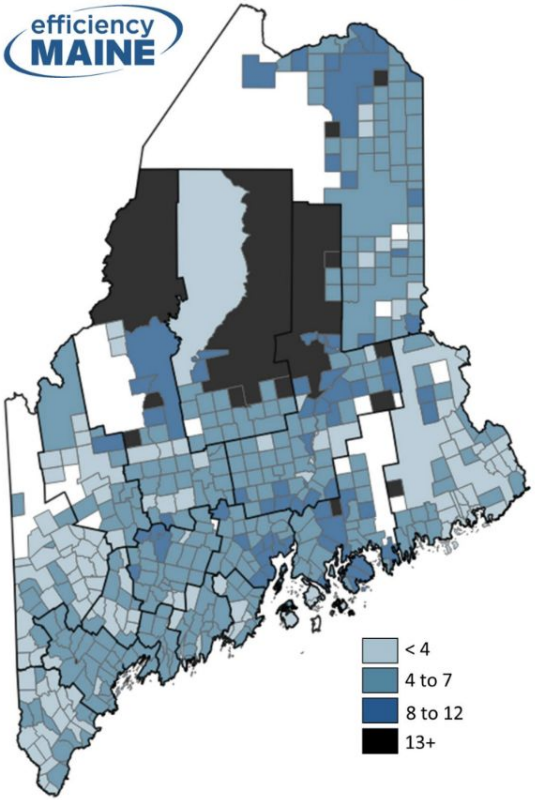
New Heat Pumps



New Heat Pumps: Low-Income



Nation-Leading Heat Pump Deployment

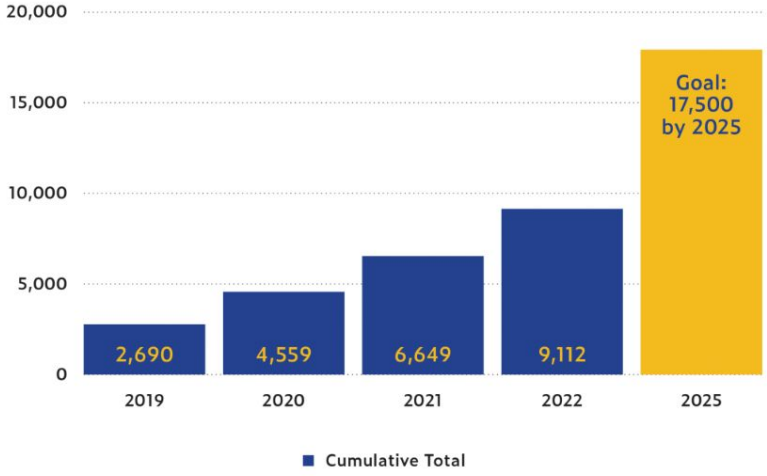


Number of heat pumps rebated per 100 population from 7/1/2020 to 6/30/2022 (1 heat pump = 25.1 MMBTU offset)

A FOUR-YEAR PLAN FOR CLIMATE ACTION
MAINE WON'T WAIT
DECEMBER 2020
MAINE CLIMATE COUNCIL

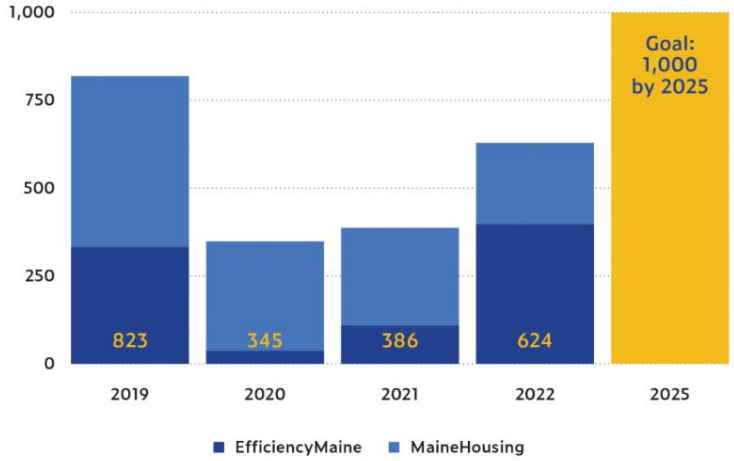
Homes Weatherized: On Pace for 2025 goal

Homes Weatherized



Source: EfficiencyMaine & MaineHousing.

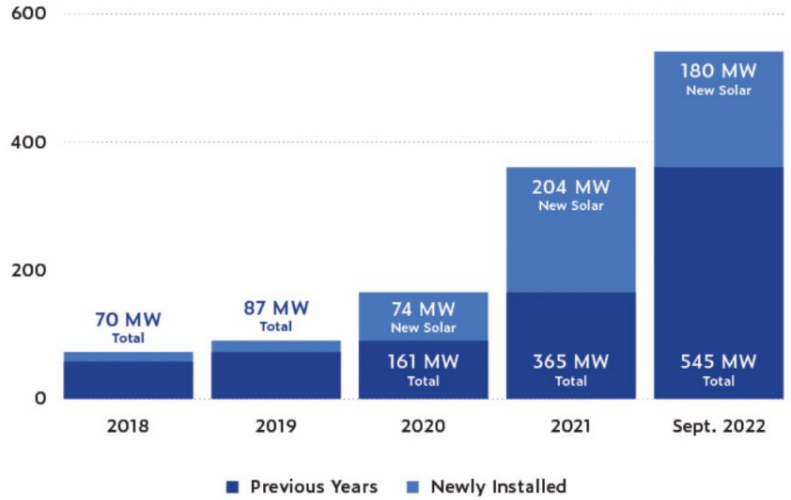
Homes Weatherized: Low-Income



Source: EfficiencyMaine

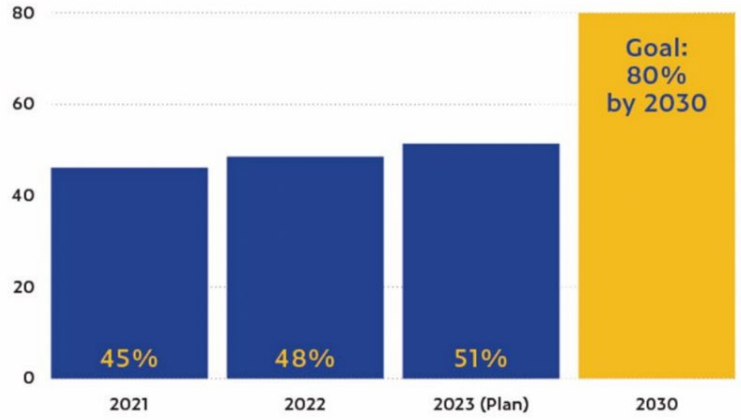
Accelerating Pace of Clean Energy Deployment

Solar Capacity Installed in Maine (Megawatts)

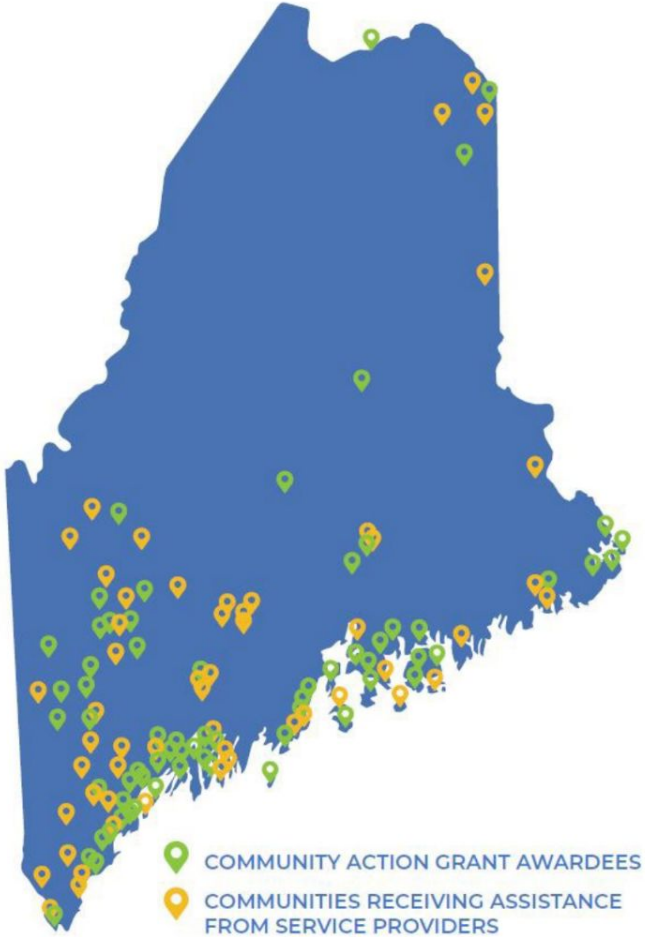


Source: Maine Governor's Energy Office: Solar

Maine Renewable Electricity



Source: Governor's Energy Office



Community Resilience Partnership

139 participating communities

- 99 fully enrolled communities
- 40 communities working with Service Providers to enroll

Community Resilience Partnership

$6 million requested in the biennial budget for local, tribal, and regional grants and assistance to reduce carbon emissions, transition to clean energy, and prepare for climate change impacts.

Types of funding opportunities

- **Grants to communities** for planning and implementation
- **Grants to service provider organizations** to help communities get started

www.maine.gov/future/climate/community-resilience-partnership

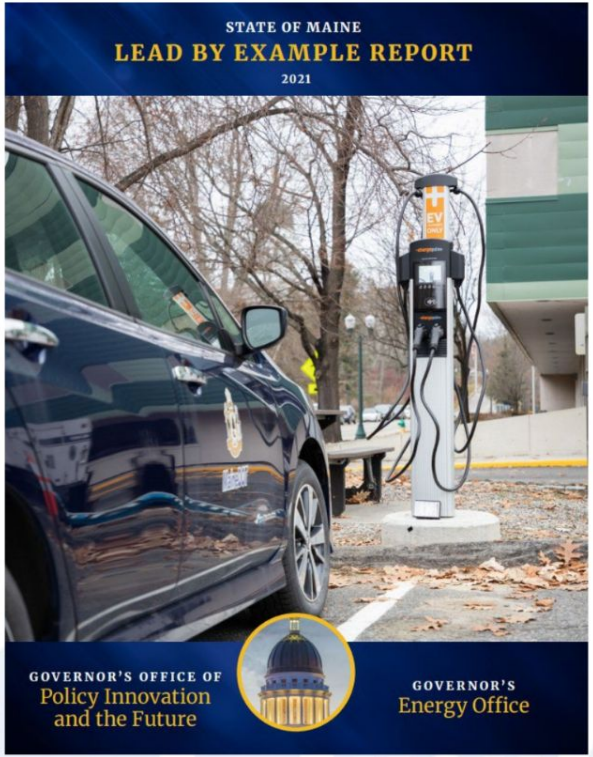
COMMUNITY RESILIENCE PARTNERSHIP

Fall 2022 Grant-funded Projects

- **Solar**: Aroostook Band of Micmacs, Limestone, Falmouth, Lamoine, Paris, Waterford
- **Heat pumps**: Carthage, Cumberland, Falmouth, Farmington, Greenwood, Lamoine, Livermore, Millinocket, North Yarmouth, Otisfield
- **Energy Audits, Facility Efficiency Projects**: Bar Harbor, Bath, Bethel, Bowdoinham, Castine, Georgetown, Harpswell, Jay, Woodstock
- **Electric vehicles, EV charging, Complete Streets**: Camden, Hallowell, Carrabassett Valley, Dover-Foxcroft
- **Climate Action Plans**: Brunswick, Freeport & Yarmouth, Mount Desert, North Yarmouth, Orono & Bangor, Rockport, Tremont
- **Natural systems, nature-based solutions**: Lisbon, Lubec
- **Drinking Water Supply & Infrastructure**: Chebeague Island, Westport Island, Monhegan Plantation
- **Vulnerable Infrastructure**: Blue Hill & Brooksville, Fort Kent, Islesboro, St. George, Rockland, Surry
- **Outreach, vulnerable populations, youth**: Arrowsic, Portland, Kennebunkport & Kennebunk, South Portland, Eastport & Passamaquoddy Tribe at Pleasant Point, Woolwich

State "Lead by Example" targets

- **Reduce state agencies' greenhouse gas emissions by a further 30 percent** by 2030, to meet the Maine's overall statutory target of a 45 percent reduction
- **Purchase 100% clean energy for state operations** by 2024 and generate clean energy on state facilities and lands where practical, such as through installing solar on state lands or buildings
- **Purchase 100% light-duty zero-emission vehicles** (ZEVs) for the state fleet by 2030
- **Assess the vulnerability of state-owned infrastructure** to climate change effects, such as rising sea levels
- And more



American Rescue Plan Act → Maine Jobs and Recovery Plan

maine.gov/jobsplan

Bipartisan Infrastructure Law

BIL Investment Categories

By executive order of Governor Mills, the State has established an Infrastructure Implementation Committee to coordinate the implementation of BIL initiatives among the State, cities, towns, tribal governments, and other entities in Maine. For more about each BIL category, visit the Categories page.

Transportation

BIL funding will support important investments in Maine's transportation system to support economic opportunity and quality of life.

Coordinating Agencies: Maine Department of Transportation, Governor's Energy Office, Governor's Office of Policy Innovation and the Future, Department of Environmental Protection, Efficiency Maine, and Department of Economic and Community Development.

Resilience & Environmental Protection

Programs to strengthen the state's preparedness for storm events, flooding, and wildfires; to build resilience of transportation networks, drinking water and wastewater systems; to mitigate contaminants and pollution; and to improve natural capacity of watersheds and ecosystems.

Coordinating Agencies: Coordination of these investments is through a BIL Resilience Working Group, a cross-agency effort established to take advantage of BIL resilience opportunities which include over $50 billion for evacuation routes, coastal resilience, improving infrastructure resilience, or efforts to move infrastructure to nearby locations less impacted by extreme weather and natural disasters.

Energy Programs & Building Efficiency

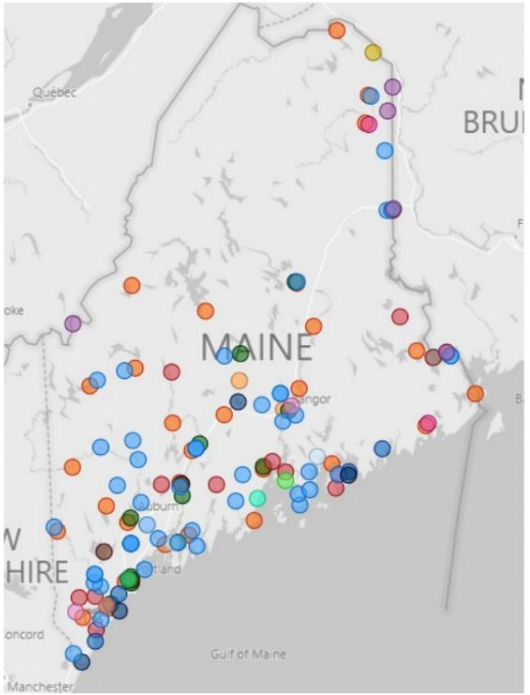
Programs supporting improved energy efficiency in buildings and the expansion of affordable, clean energy generation and transmission networks.

Coordinating Agencies: Governor's Energy Office, Maine Department of Transportation, Governor's Office of Policy Innovation and the Future, Efficiency Maine, MaineHousing, and the Maine Public Utilities Commission.

Broadband & Technology

Programs to expand the interconnection and economic viability of Maine communities through improved, robust, affordable and universally available high speed internet (broadband) and secure information systems.

Coordinating Agencies: Department of Economic and Community Development, Maine Connectivity Authority, Department of Administrative and Financial Services, and Maine Department of Transportation.



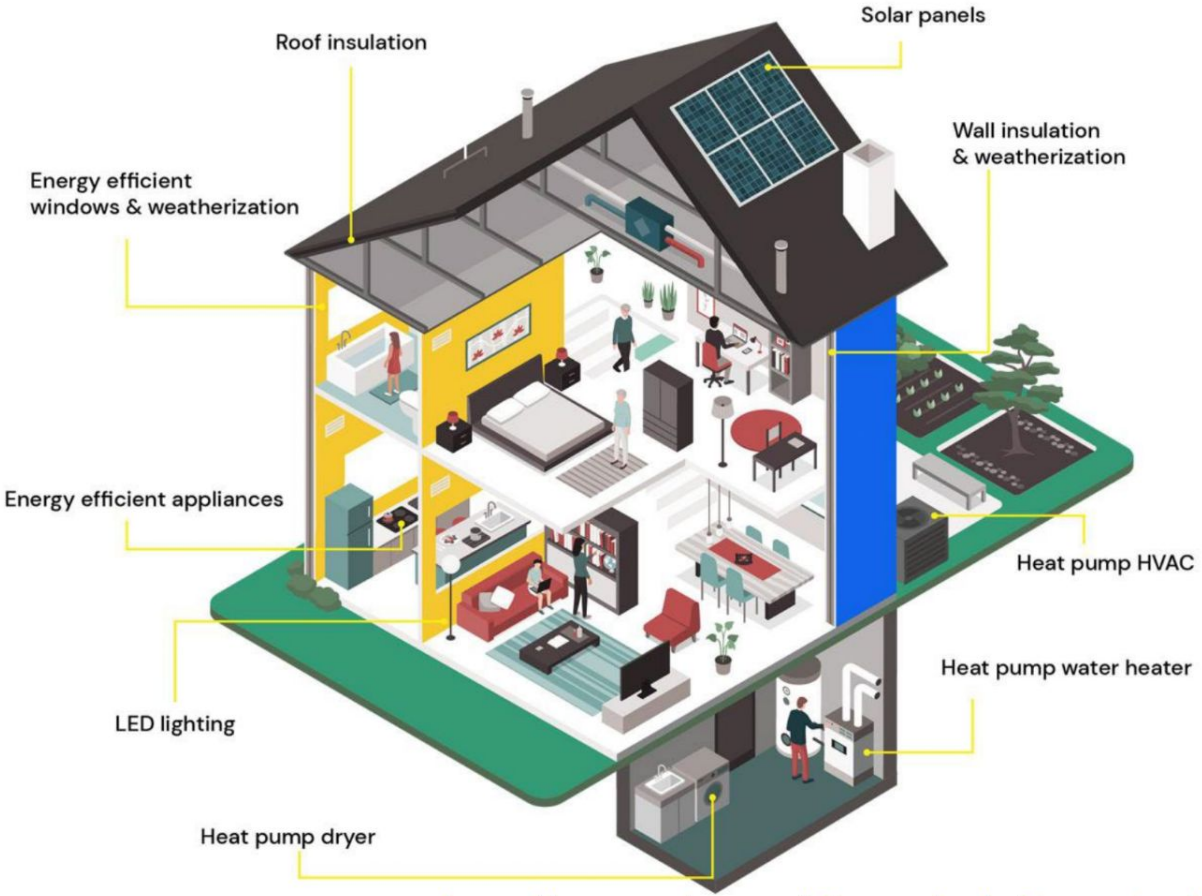
Maine.gov/BIL

A FOUR-YEAR PLAN FOR CLIMATE ACTION
MAINE WON'T WAIT
DECEMBER 2020
MAINE CLIMATE COUNCIL

Inflation Reduction Act

$370B for climate and energy with the aim of reducing US greenhouse gas emissions by 40% by 2030

- **Major federal focus on equity** and support for disadvantaged communities and people
- **A few examples in Maine:**
  - Energy Efficiency Community Block Grant – municipal projects (TBD)
  - HOMES and HEERA funds for weatherization and heat pumps in low income households (TBD)
  - Energy Efficient Home Improvement Tax Credit
    - Exterior doors, windows, insulation, high efficiency electric heat pumps, electric heat pump water heaters, etc.
    - 30% of project costs, up to a max (https://www.energystar.gov/about/federal_tax_credits/non_business_energy_property_tax_credits)
    - Combine with Efficiency Maine rebates
  - 30% tax credit for residential solar, battery storage, more
    - municipalities can now receive tax credits via direct-pay for solar, battery storage, EVs, energy efficiency improvements
  - Electric vehicle rebates for new and used vehicles + higher incentives for low-income buyers



Homeowner's guide to state and federal incentives

https://www.maine.gov/climateplan/taking-action/actions-for-home

A FOUR-YEAR PLAN FOR CLIMATE ACTION
MAINE
WON'T WAIT
DECEMBER 2020
MAINE CLIMATE COUNCIL

Contact

Brian Ambrette
Governor's Office of Policy Innovation and the Future
Brian.Ambrette@maine.gov

maine.gov/future
maine.gov/climateplan
maine.gov/climateplan/dashboard

Kelly Rehberg

Sustainability Program Manager, Greater Portland Council of Governments

Regional Sustainability and Climate Action

April 27, 2023

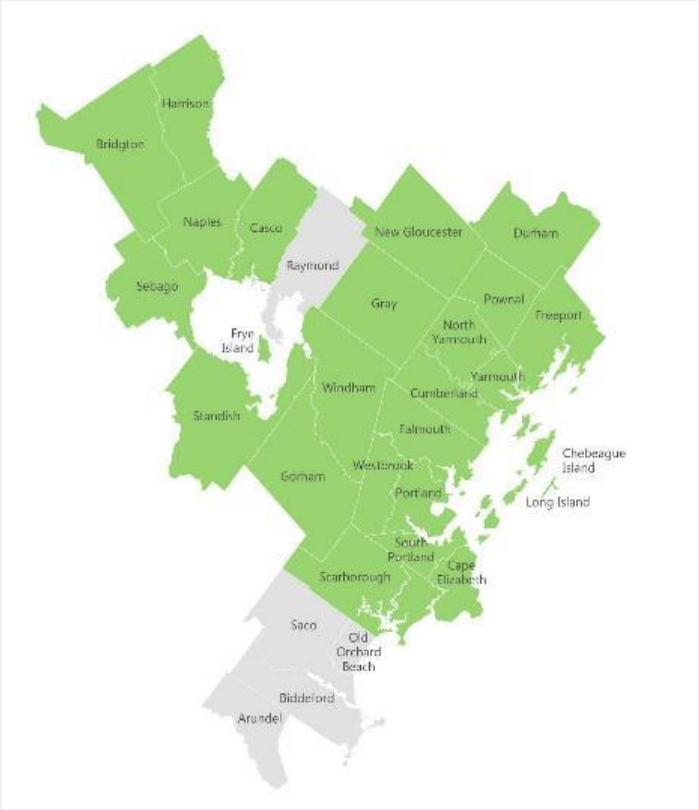
GPCOG
GREATER PORTLAND COUNCIL OF GOVERNMENTS

Agenda

- Setting the stage
- Development in the region
- Housing and climate impacts
- What communities are doing

Setting the Stage:
GPCOG

*PACTS is the primary transportation arm of the Greater Portland Council of Governments (GPCOG)



Setting the Stage:

Climate Change in Maine

We're facing a climate crisis that requires long-term planning and decisive action

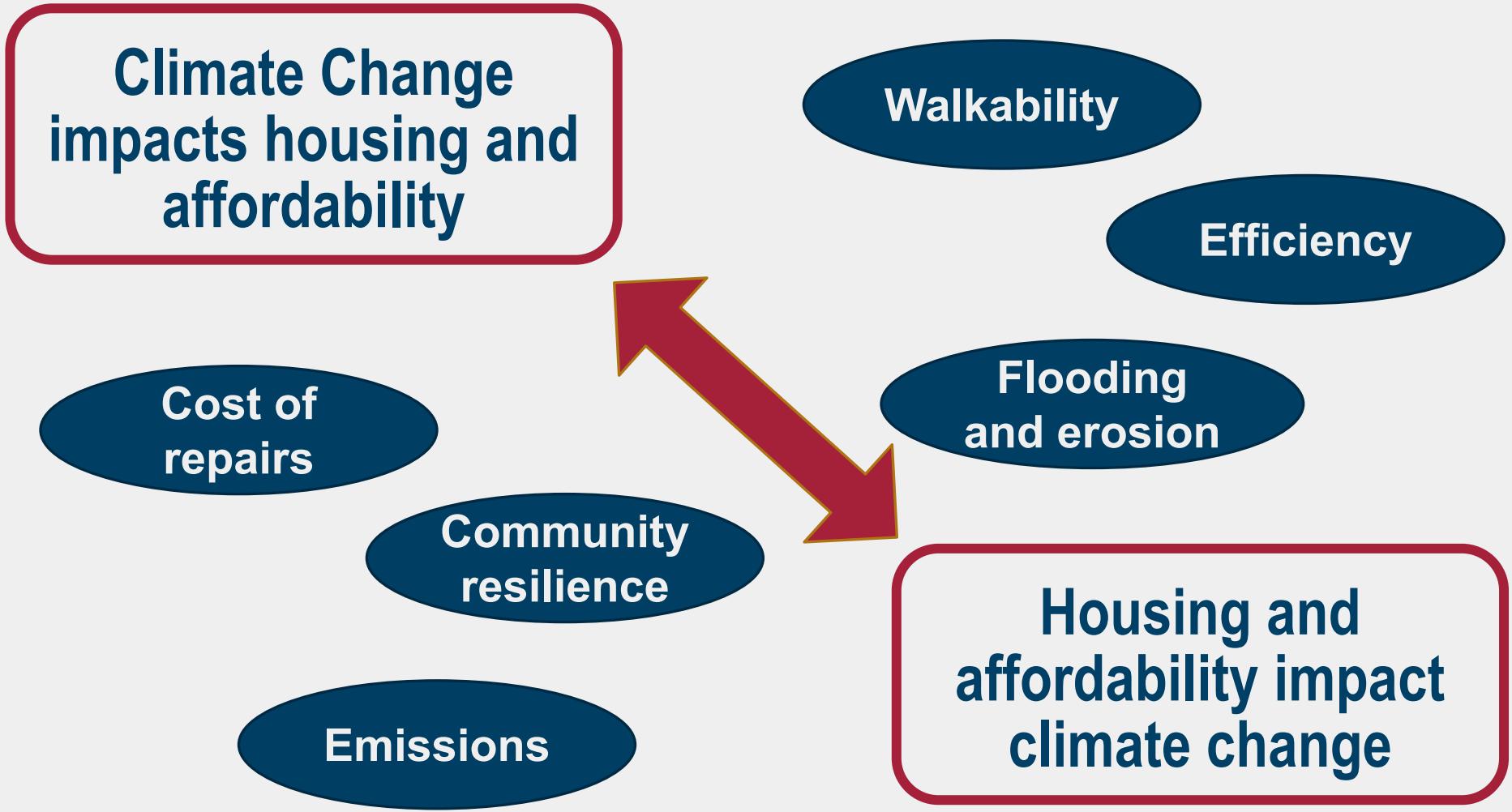
Rising Sea Levels

Changing Precipitation

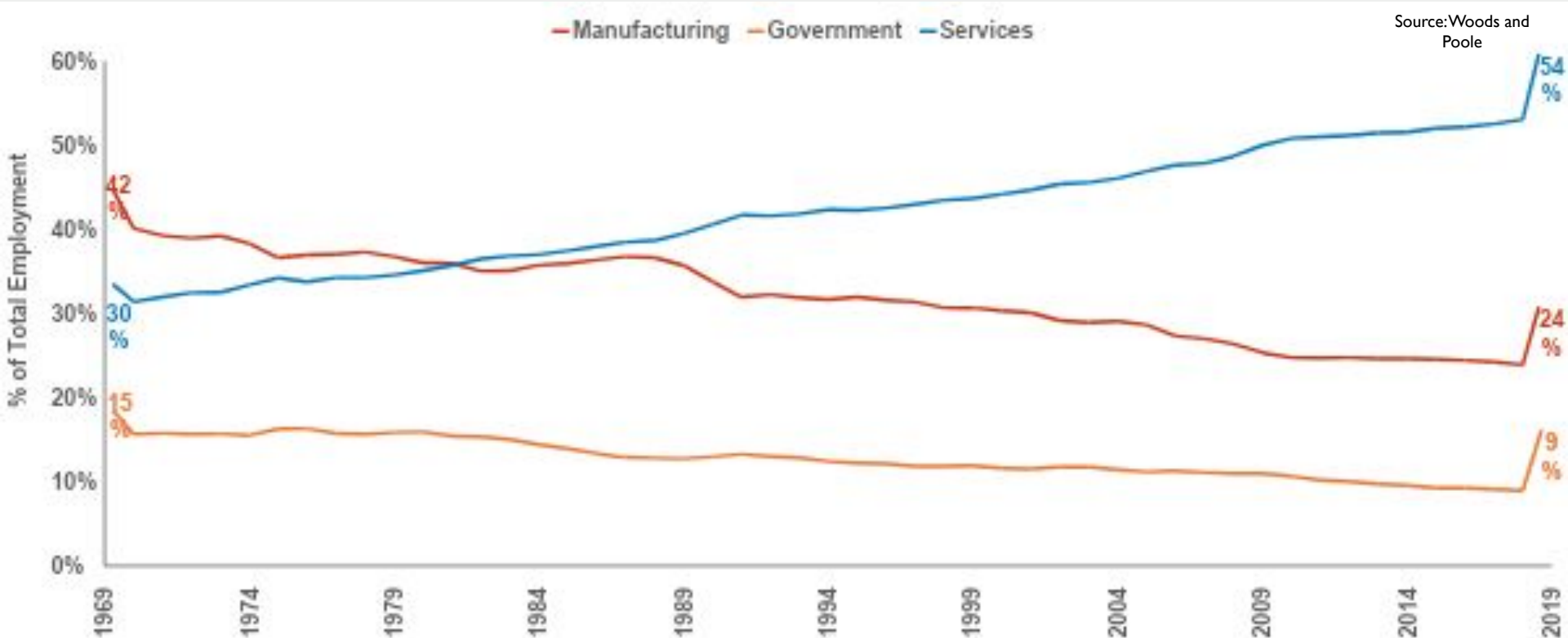
Warmer Temperatures

Changing Ocean Conditions


Setting the Stage:
Climate Change in Maine
Impacts to human health, infrastructure, ecosystems, economy, social equity, and more

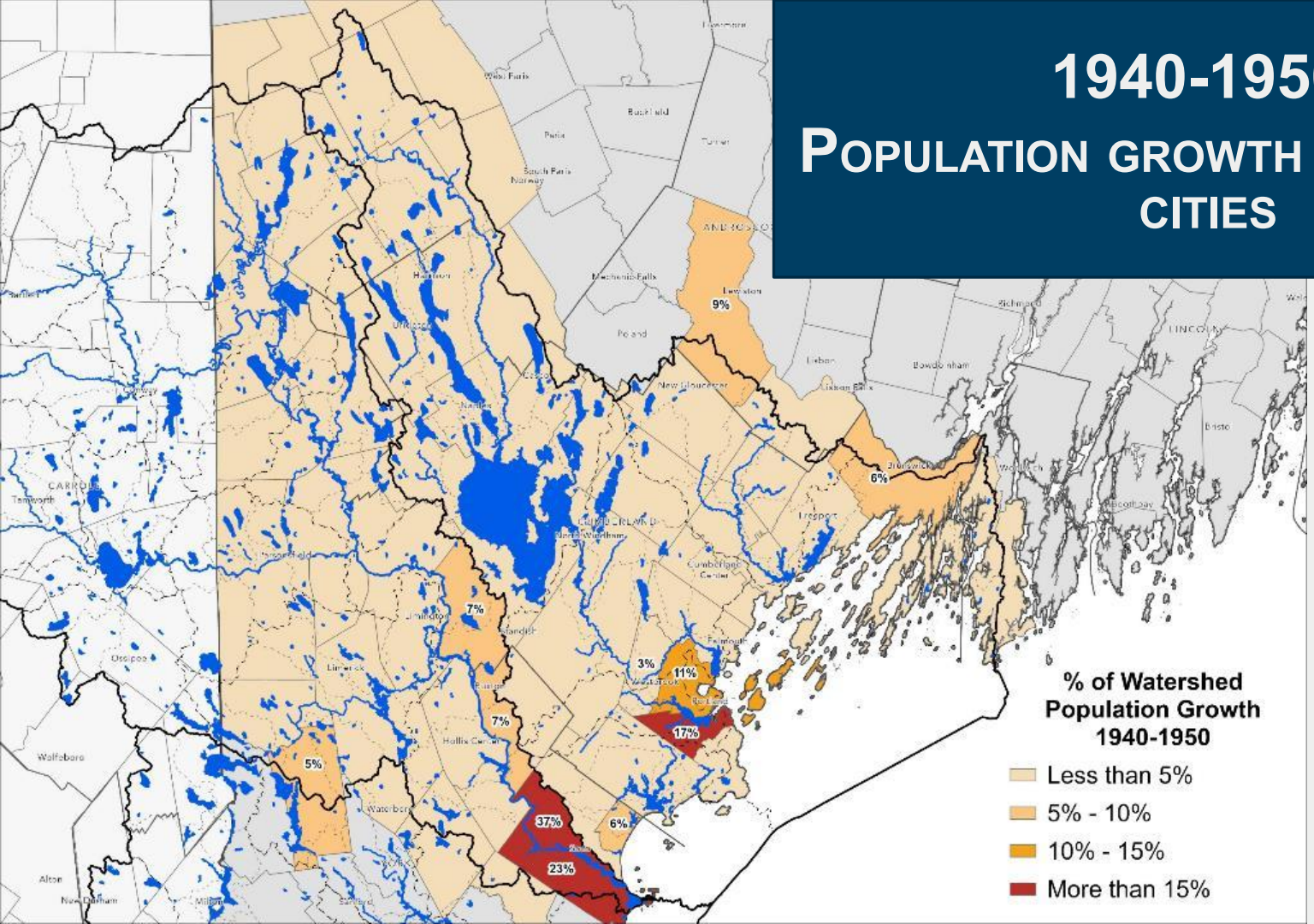

Climate Change impacts housing and affordability
Walkability
Efficiency
Flooding and erosion
Cost of repairs
Community resilience
Emissions
Housing and affordability impact climate change

Economy shifted from manufacturing to services



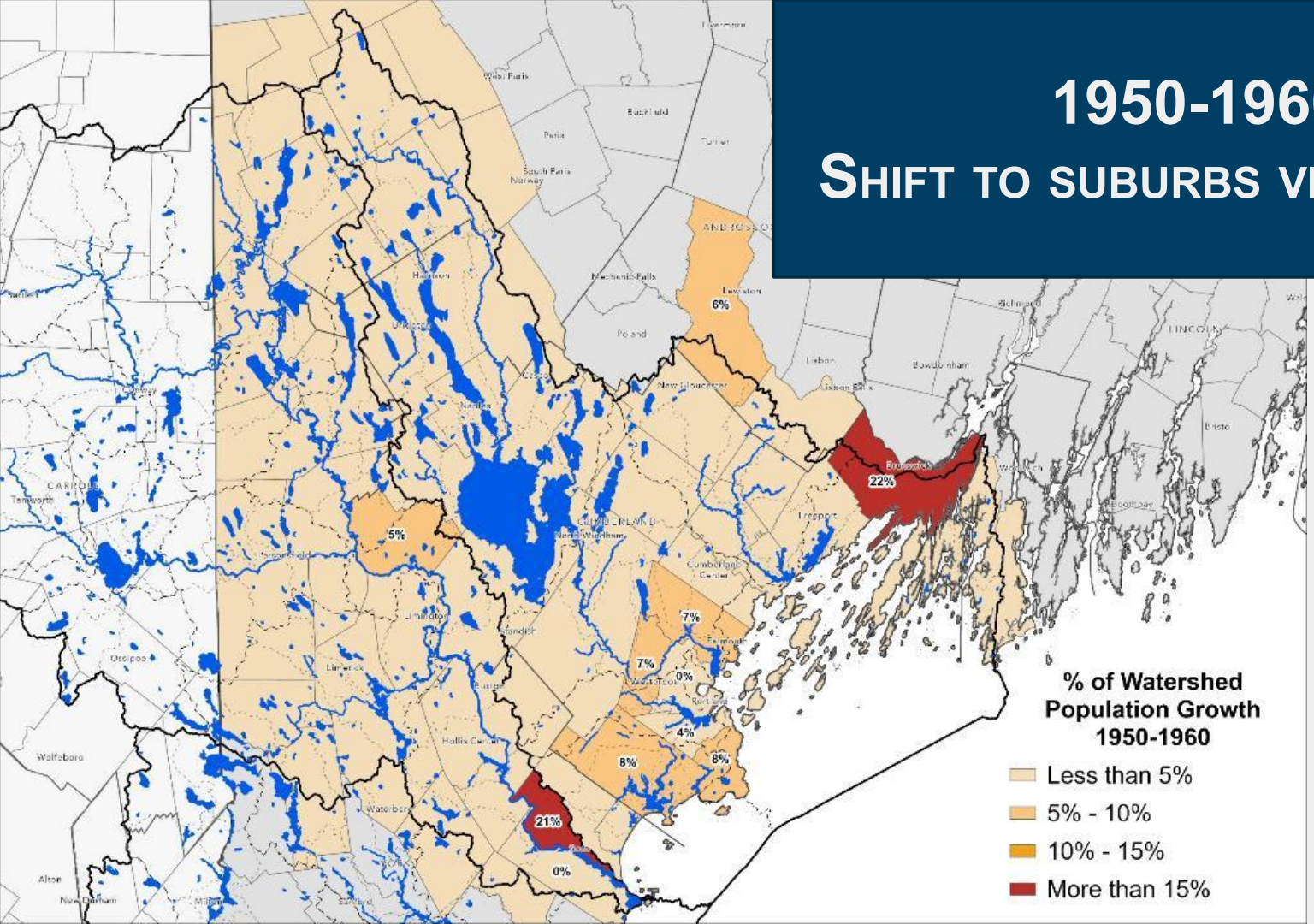
1940-1950:

Population growth centered in cities



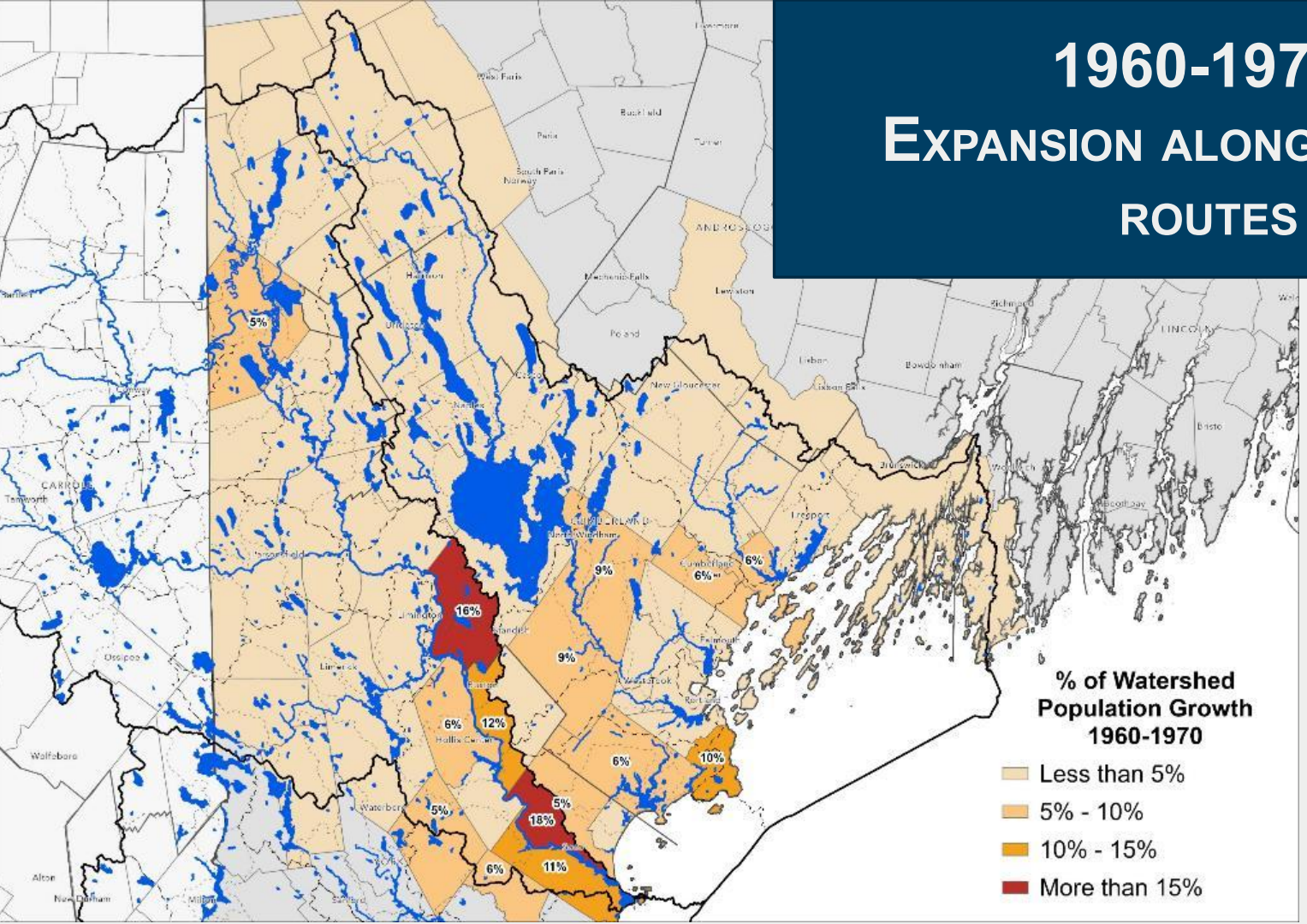
Source: NHGIS

1950-1960:
Shift to suburbs via highways



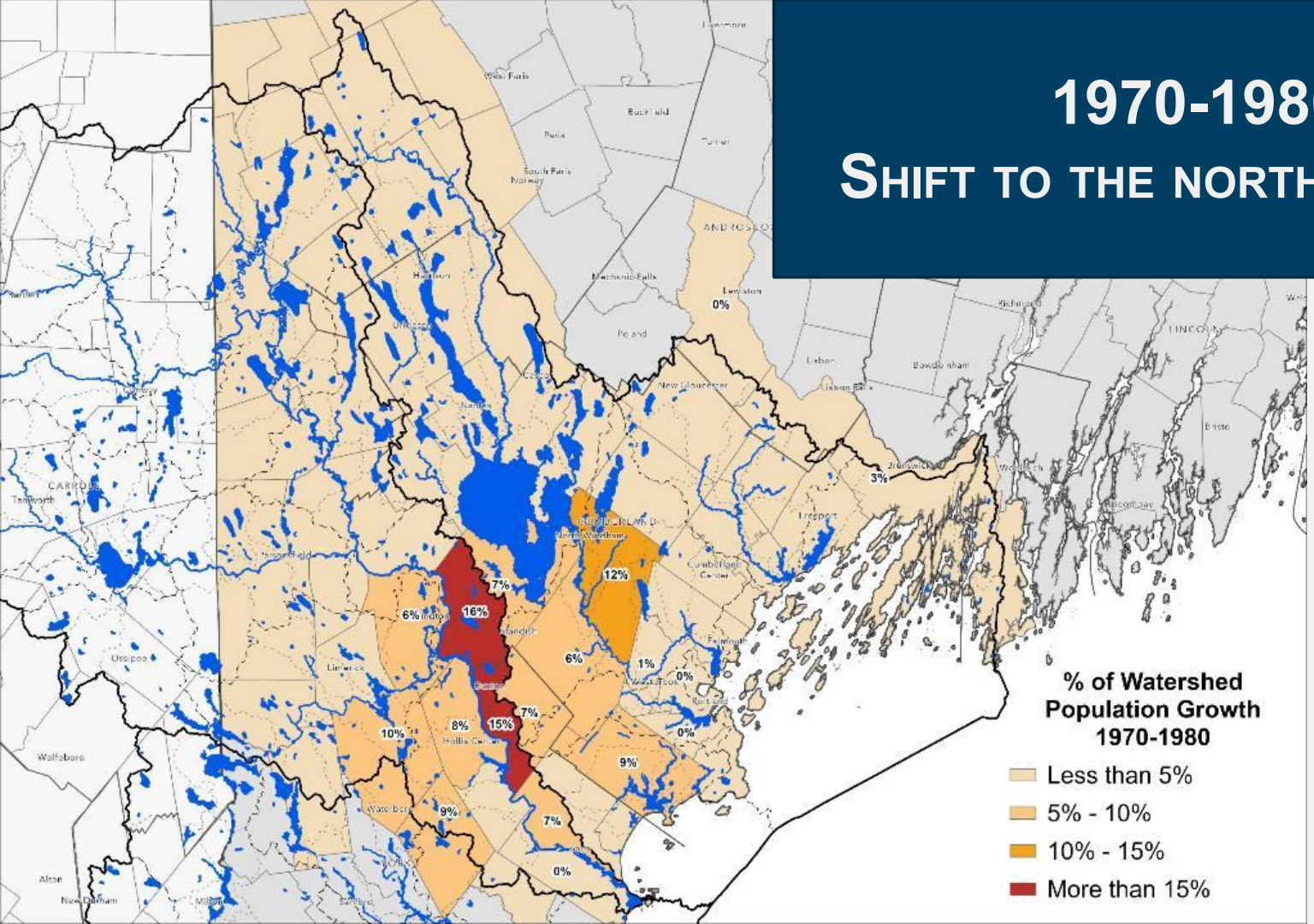
Source: NHGIS

1960-1970:
Expansion along highway routes



Source: NHGIS

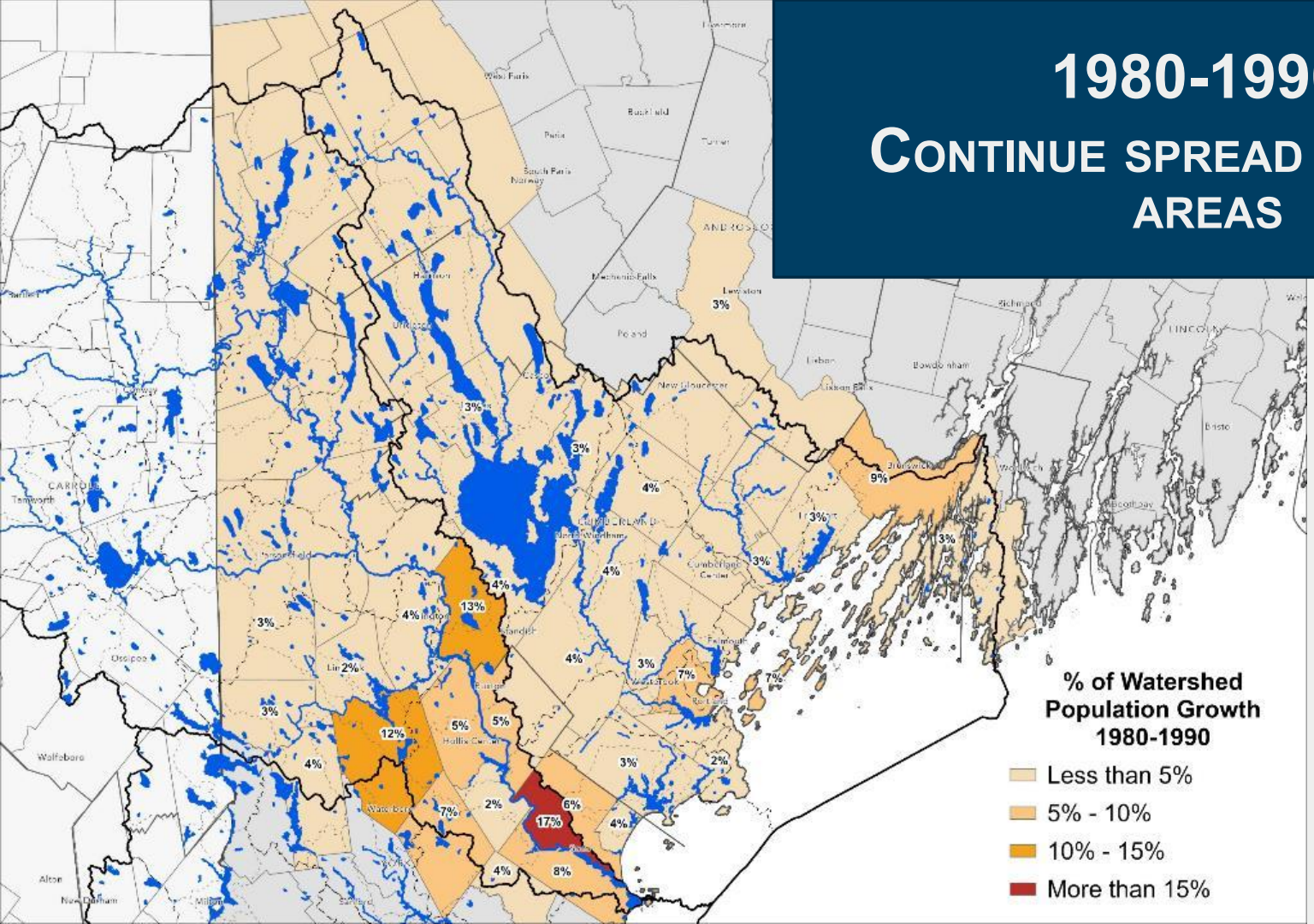
1970-1980:
Shift to the North and West



Source: NHGIS

1980-1990:

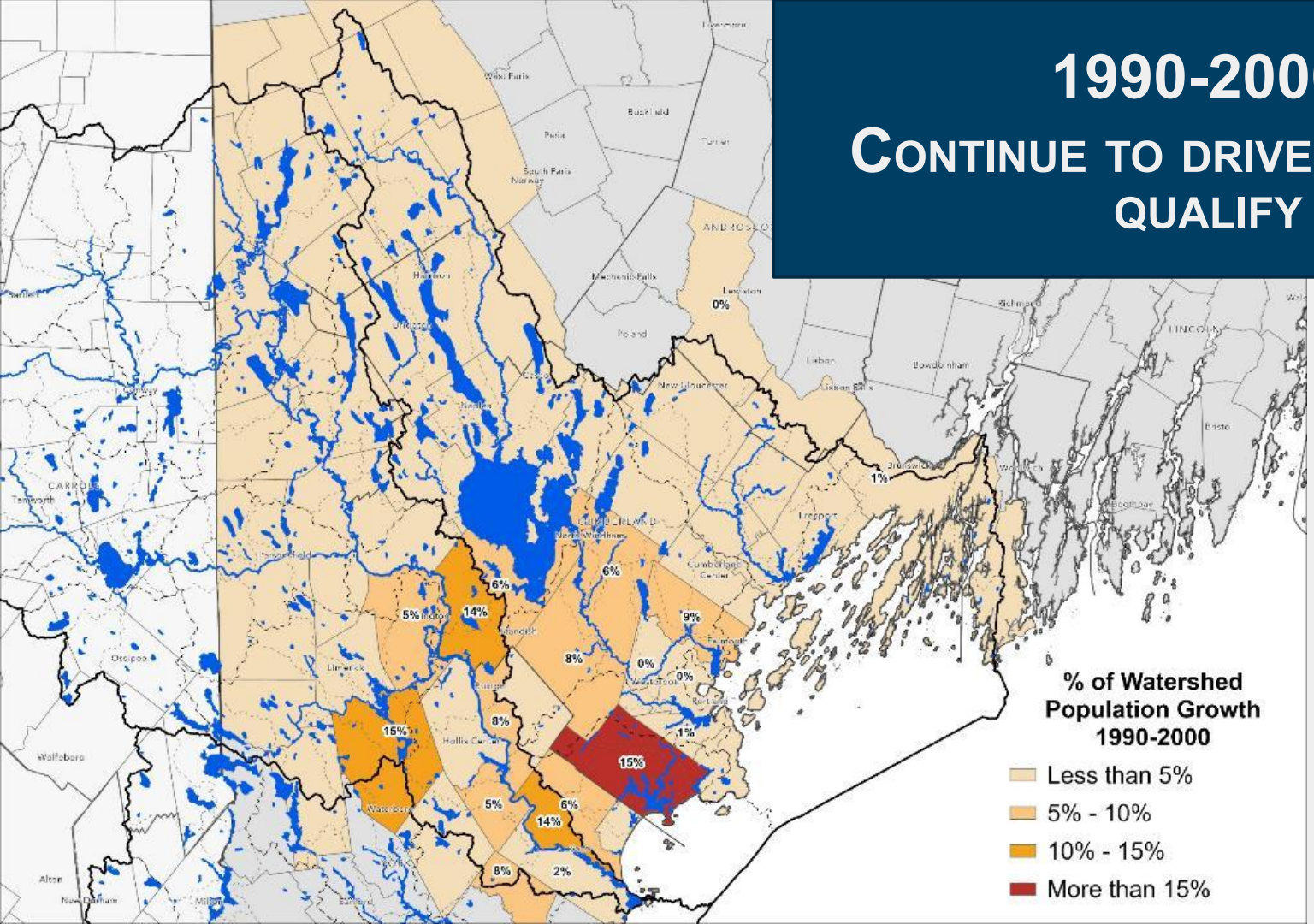
Continue spread to rural areas



Source: NHGIS

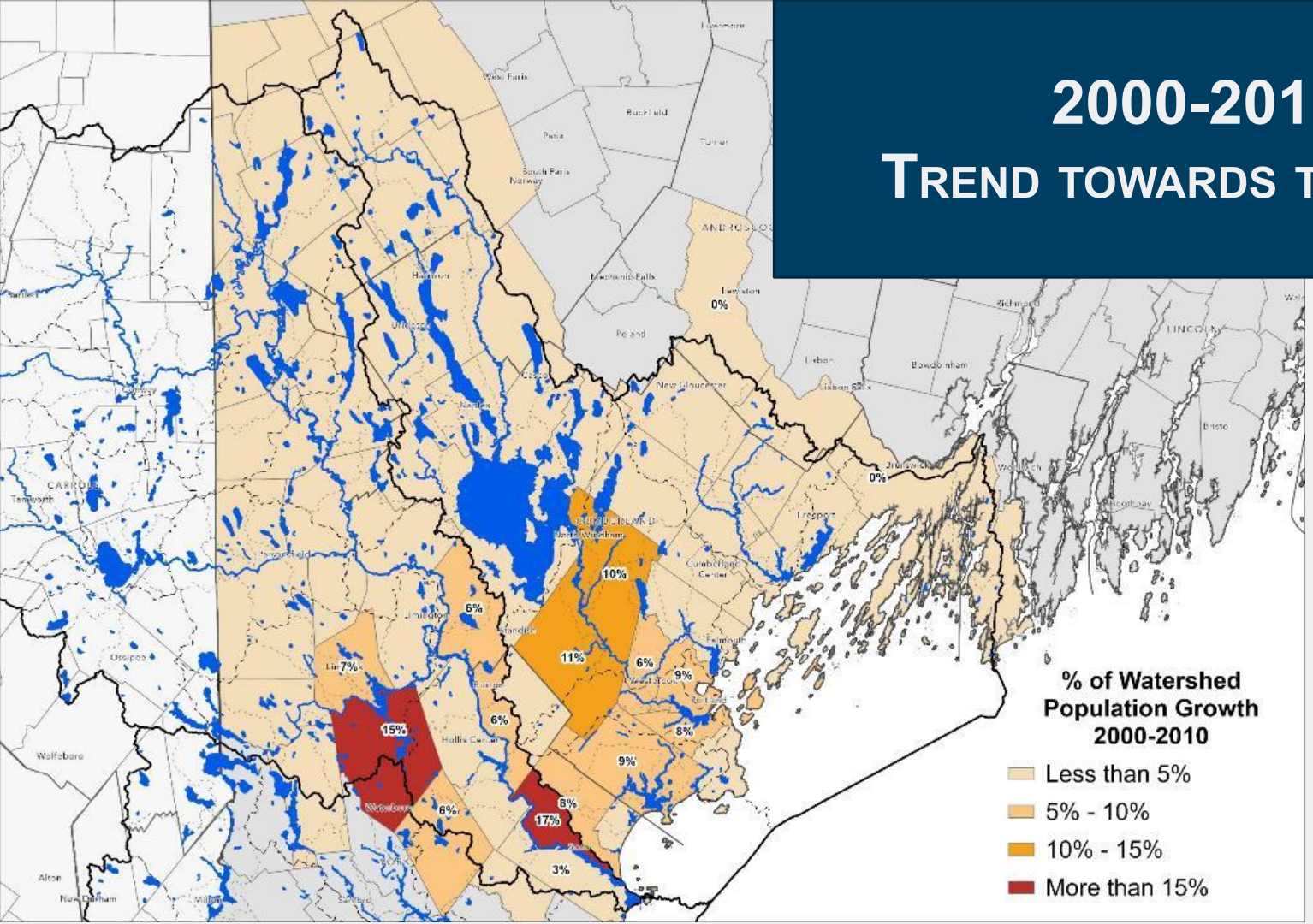
1990-2000:

Continue to drive until you qualify



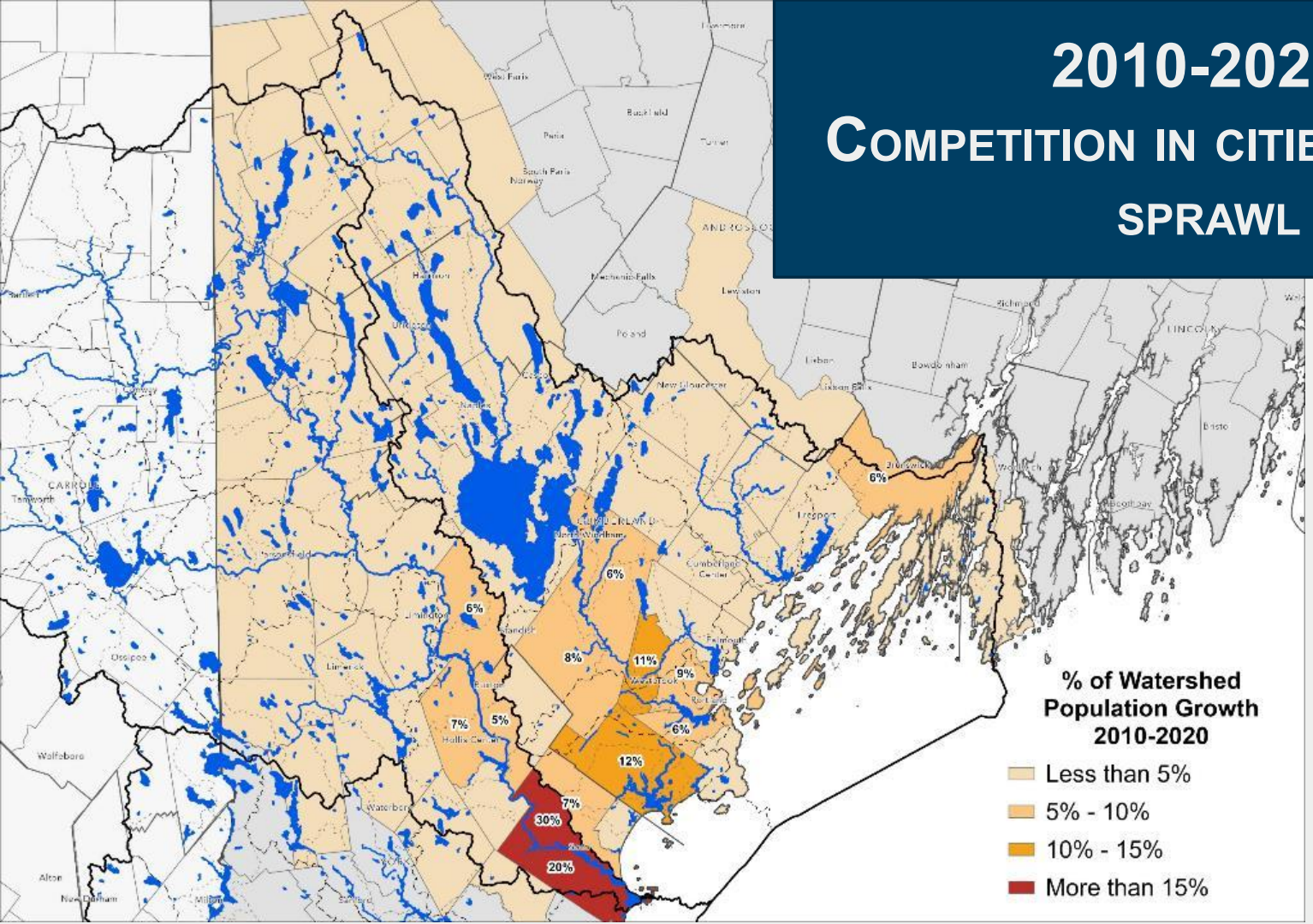
Source: NHGIS

2000-2010:
Trend towards the cities



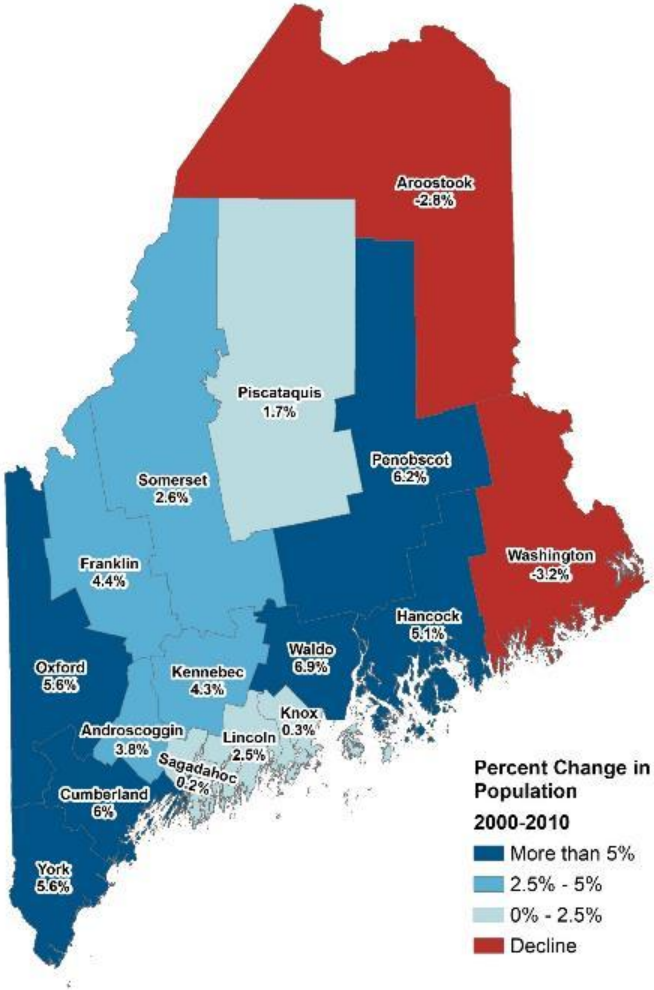
Source: NHGIS

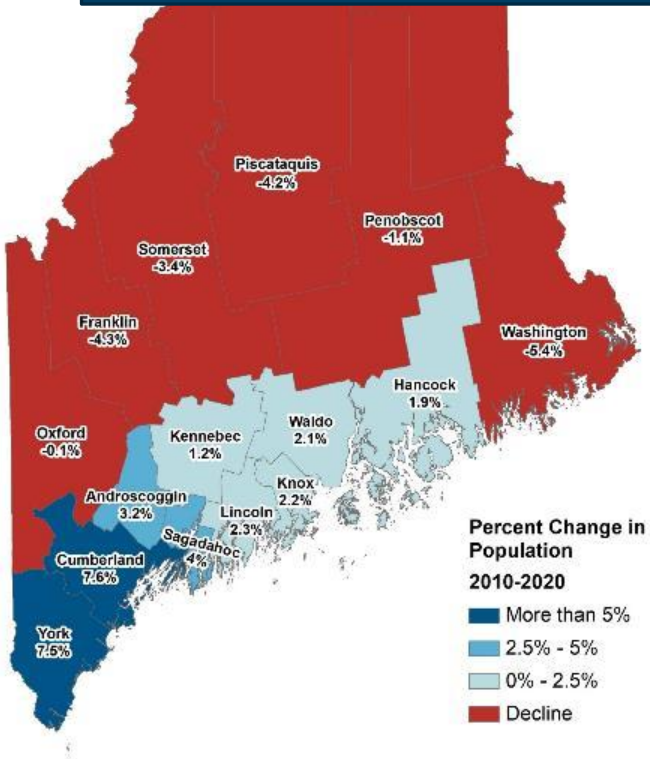
2010-2020:
Competition in cities leads to sprawl



Source: NHGIS

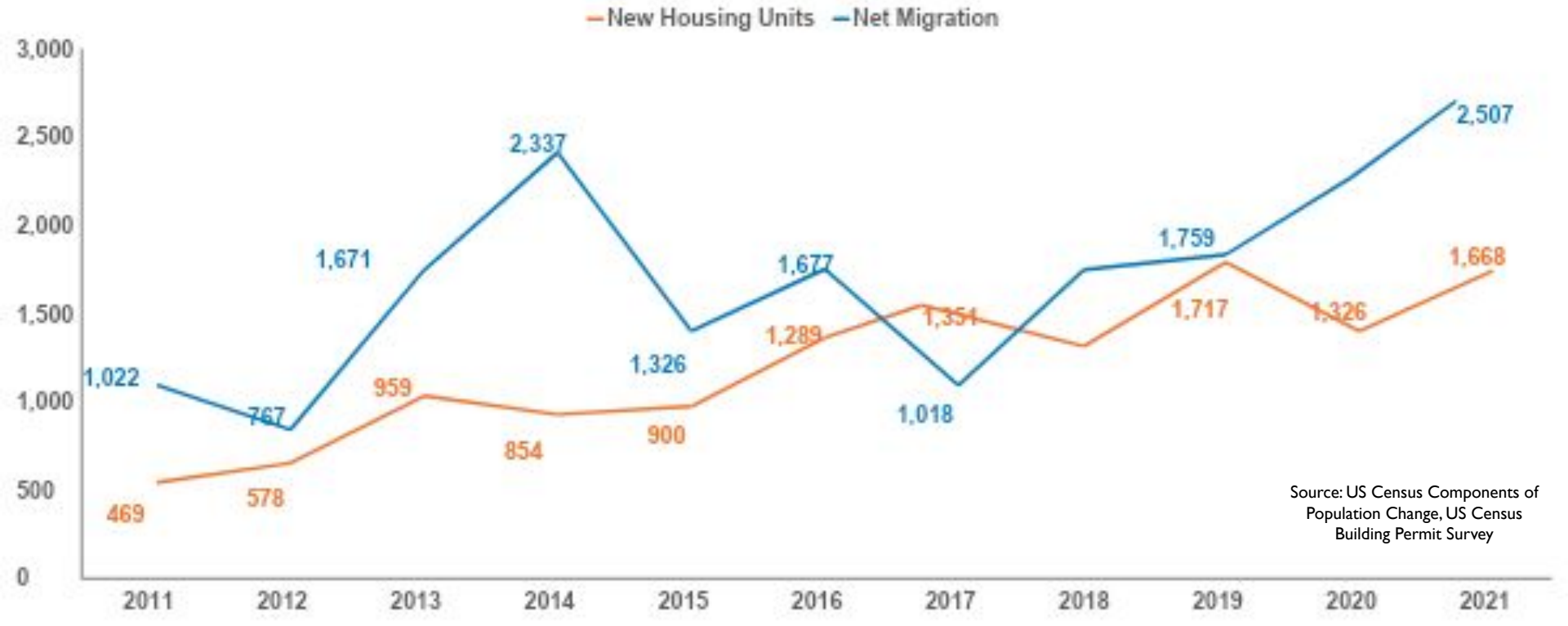
Big Picture: Population centered in Southern Maine





Source: US Census 2010 and 2020 Redistricting Data

Housing growth lagged population growth



Critical Housing Shortage

Waitlists grow as developers plan, build and fill affordable housing

Projects across the southern Mai
'we are not creating new aff
dscape aim to keep up with explosive demand, but advocates say
fast enough.'

Maine's housing crisis is building a growing bipartisan will to find solutions

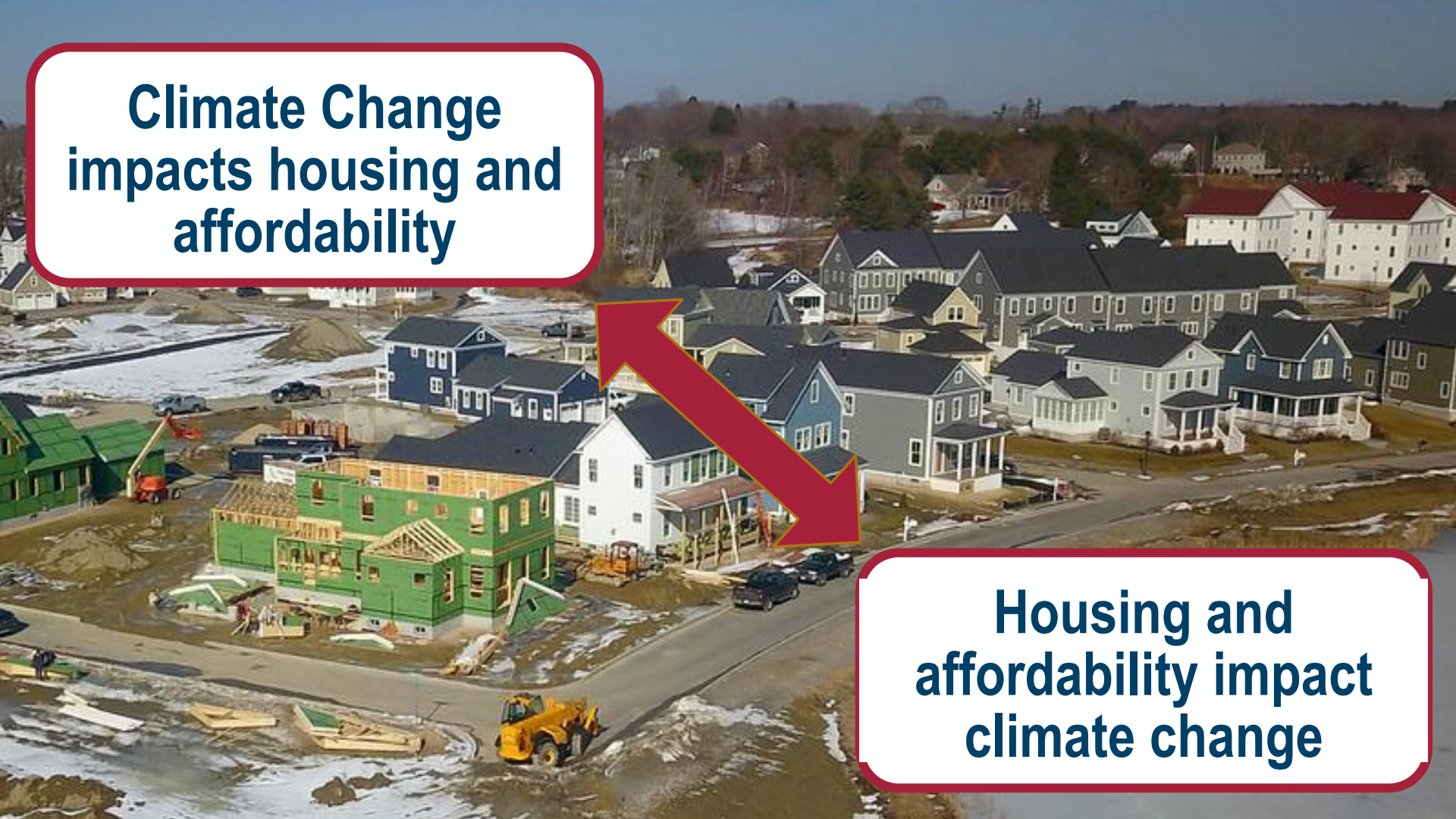
The combination of the housing crisis and the availability of federal recovery money, some think, presents a rare opportunity for leaders to come together and fix problems.

In Maine, a Rare Influx of New Residents, and a Housing Crunch

New arrivals over the last few years have fueled hopes of population growth, but workers increasingly struggle to find housing in a market gone wild.

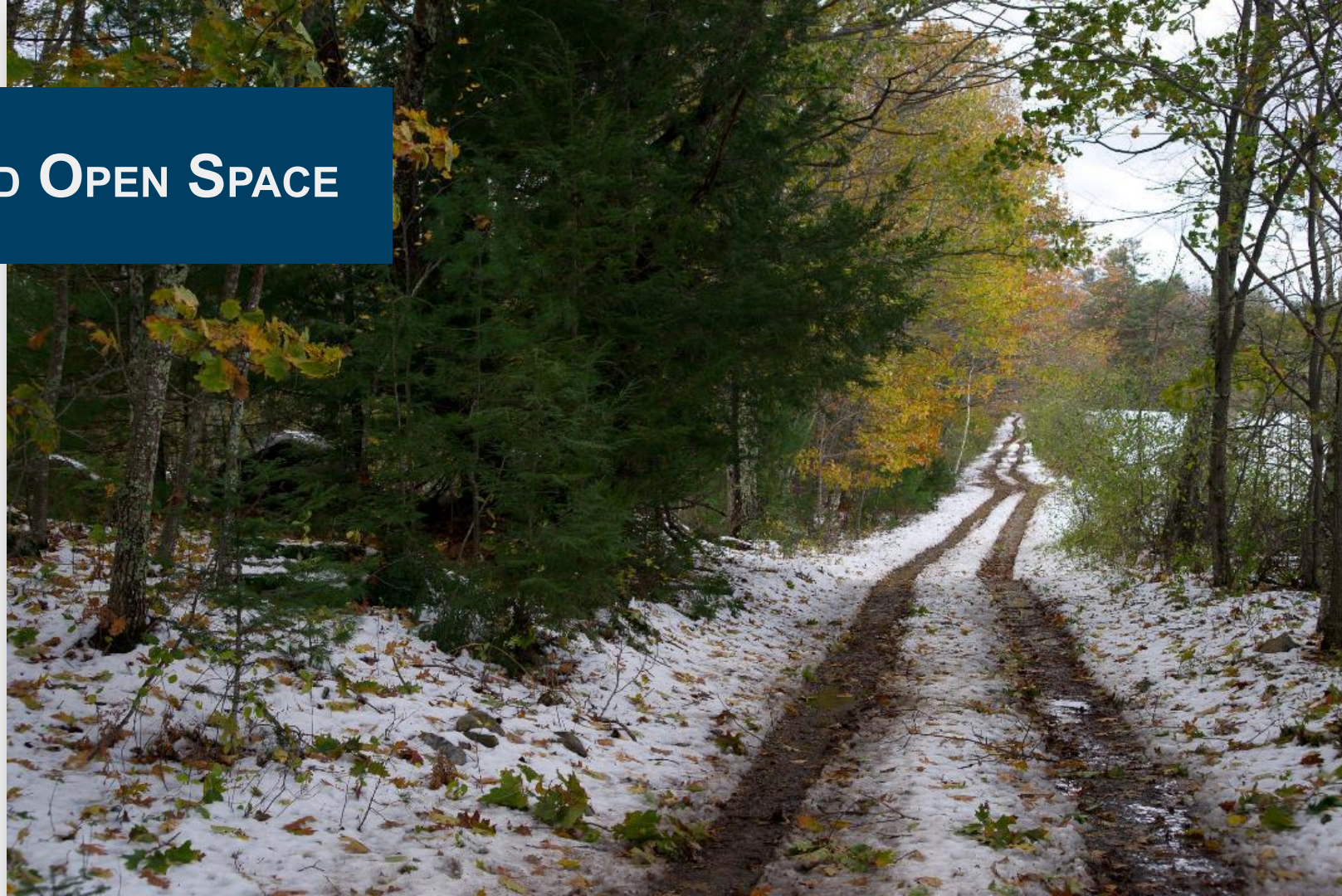
In Maine, a stubborn housing crisis has put down roots

Competing market forces are evident in South Portland, where residents face rising rents and home prices. But efforts to change the dynamic don't always work out as planned.

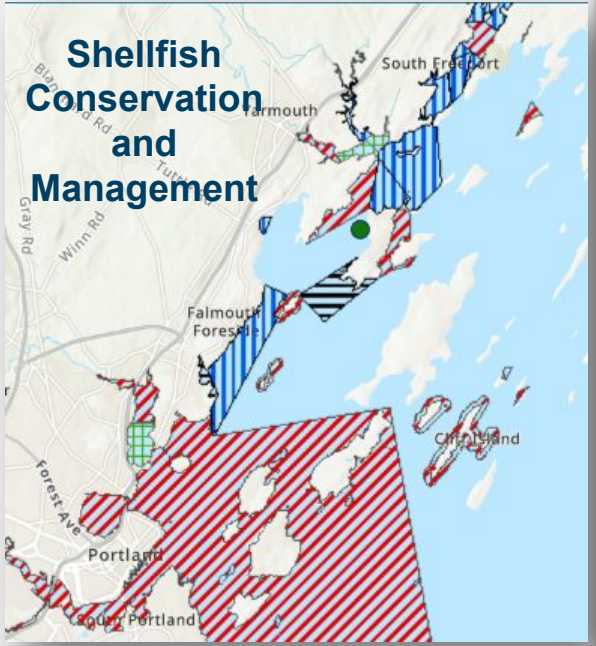

Climate Change impacts housing and affordability
Housing and affordability impact climate change

Sprawl = Increased emissions

Reduced Open Space



Decreased Water Quality



Impact on Property Values

Sustainable Development or Business as Usual

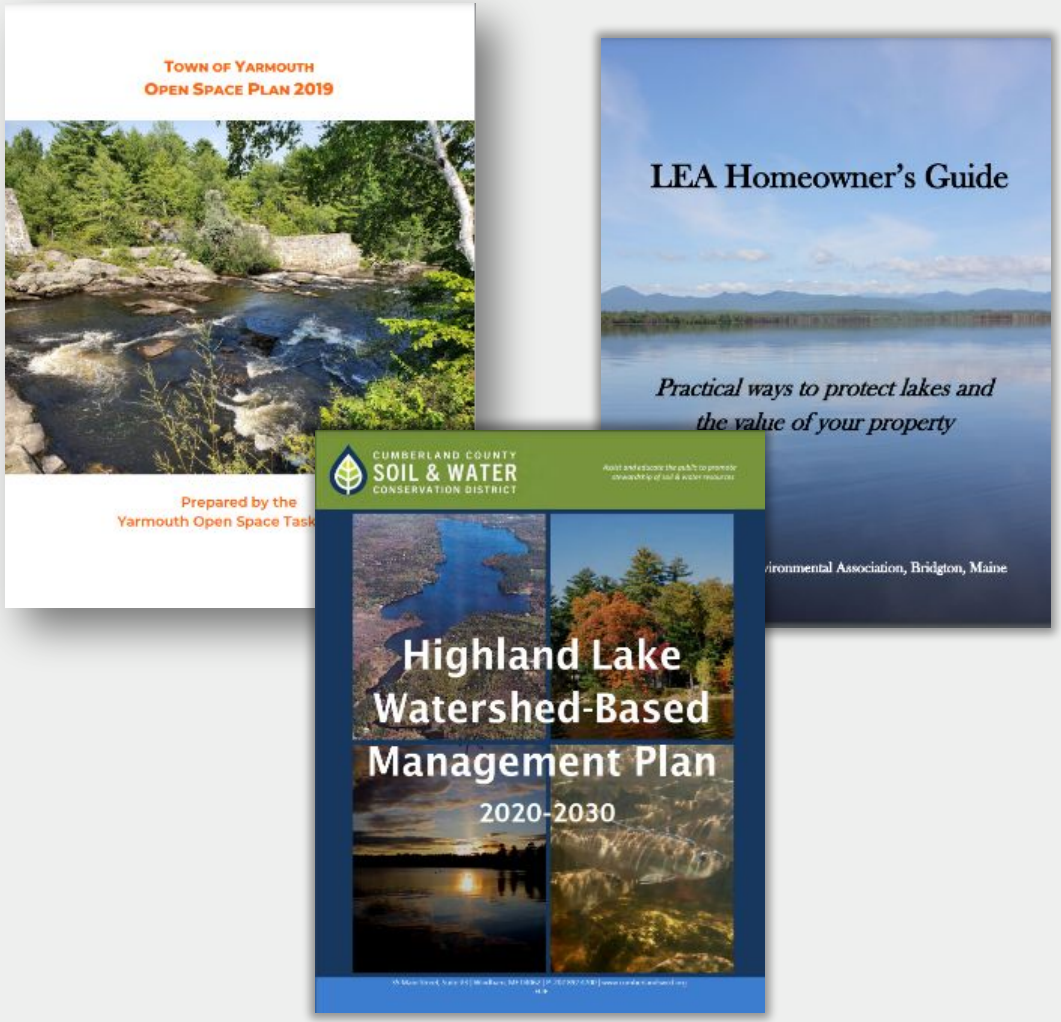
Concept for Discussion Only, This is Not a Proposal.

Source: Principle Group, Gray Village Master Plan

What is the region doing?

Planning Documents

- Comprehensive Plans
- Downtown or neighborhood plans
- Open Space Plans
- Agricultural Plans
- Watershed Management



Comprehensive Plans

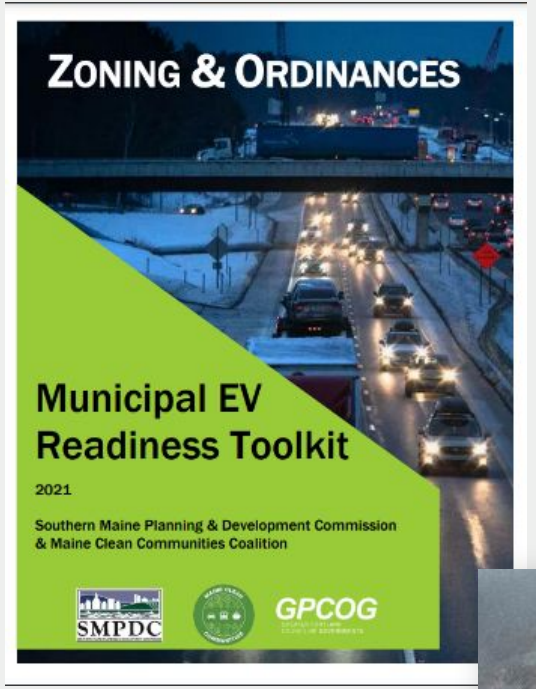
Comprehensive Plans

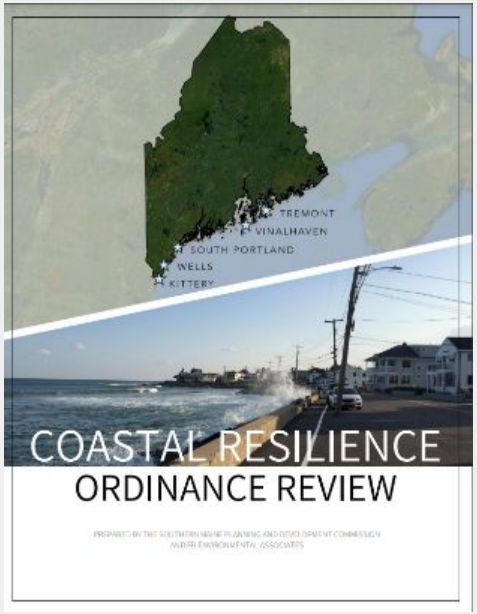
Concept for Discussion Only, This is Not a Proposal.

Source: GPCOG and Principle Group, Casco Comprehensive Plan

Ordinances

- EV Charging
- Building Codes
- Shoreland Zoning
- Floodplain
- Stormwater
- Pesticide/landscaping
- Solar

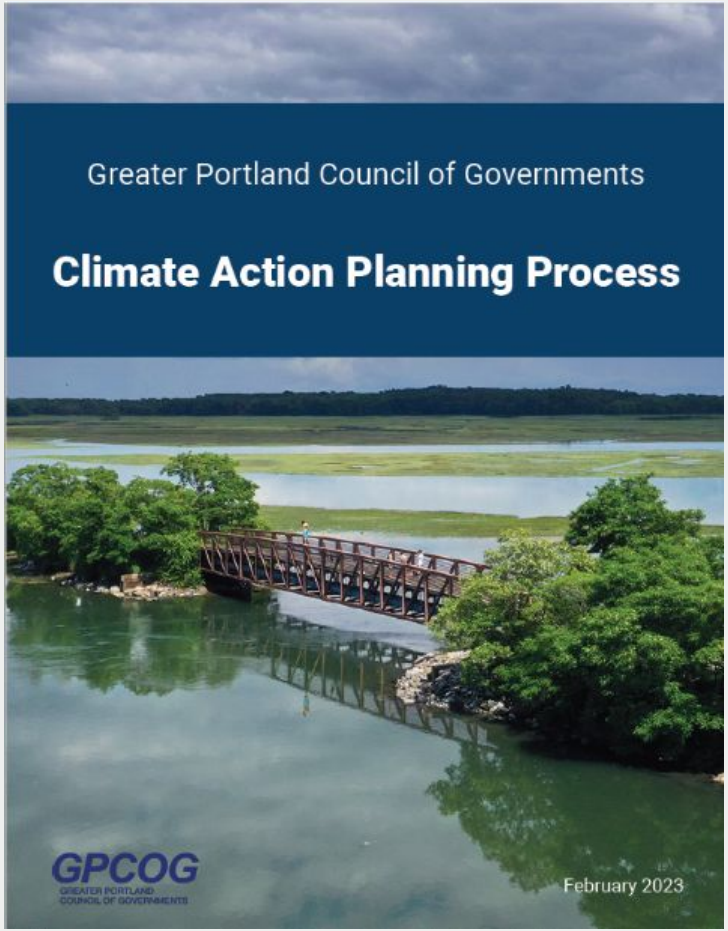




Climate Action Plans

- Falmouth
- Yarmouth
- Freeport
- Brunswick
- North Yarmouth

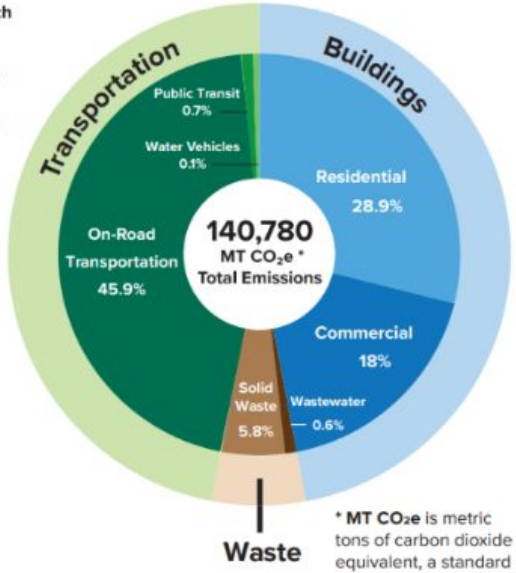
- Windham*



Greenhouse Gas Emissions Inventory

Community Emissions Profile

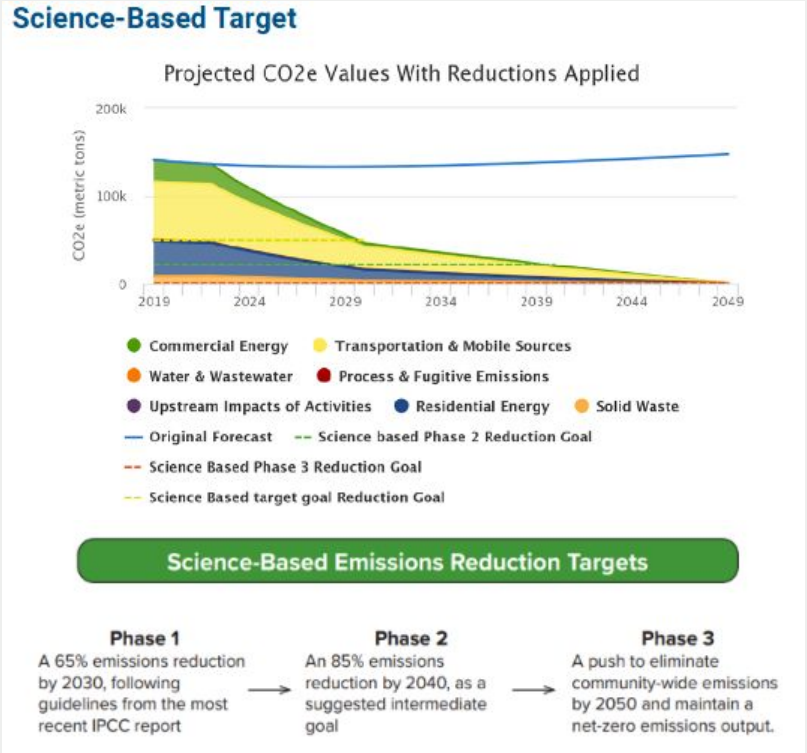
In support of the data-driven approach to this Climate Action Plan, this Greenhouse Gas (GHG) emission inventory for Falmouth in 2019 was created. The major findings of the 2019 inventory are described in the charts below.



Sector	Energy Use (MMBtu)	Emissions (CO_2e)
Buildings	1,007,979 (52%)	65,969 (46.9%)
Transport.	920,469 (48%)	65,755 (46.7%)
Waste	-	9,056 (6.4%)
Total	1,928,448 (100%)	140,780 (100%)

* **MT CO_2e** is metric tons of carbon dioxide equivalent, a standard unit for measuring GHG emissions.

Emissions Reduction Target



Assessing Climate Vulnerabilities

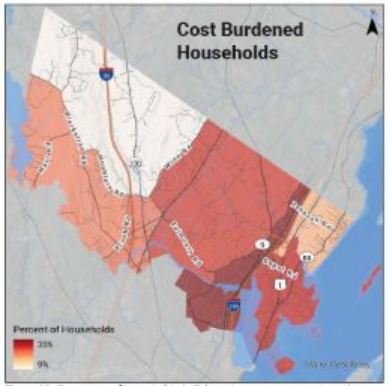


Figure 10: Percentage of households in Falmouth who are cost burdened by Census Block. Data source: U.S. Census Bureau, American Community Survey (2017-2021) Data source:

24% of Homeowners are **cost-burdened**

14% of residents are renters, **almost half are cost-burdened**

23% of rented households spend at least half of their monthly income on rent, classifying them as **significantly cost-burdened**.

Native Species Migration and Shifting Ecosystems

Warmer air and water temperatures cause shifts in species' geographic ranges, leading to declines in native marine and terrestrial life and increases in invasive species, pathogens, and pests. These shifts alter the local food web, making ecosystems more vulnerable to stressors such as invasive species and habitat destruction.

Maine's fishing industry is particularly susceptible to species migration due to warming water temperatures and ocean acidification. Scallops, shrimp and groundfish – all significant species in Maine – could shift northward to waters in Canada if ocean temperatures continue to rise.

Recent research predicts that lobster populations are likely to shift 200 miles further north because of climate change.[54] However, other research suggests that Gulf of Maine waters may remain resilient and suitable for lobster populations.[55] Atlantic Cod populations in the Gulf of Maine have been declining since before 1990, and recent research suggests that the remaining habitat for the species in the North Atlantic could shrink by over 90% by 2100 due to warming waters.[56] As native species move north, the Gulf of Maine is likely to see increases in other species that are more accustomed to warmer waters.

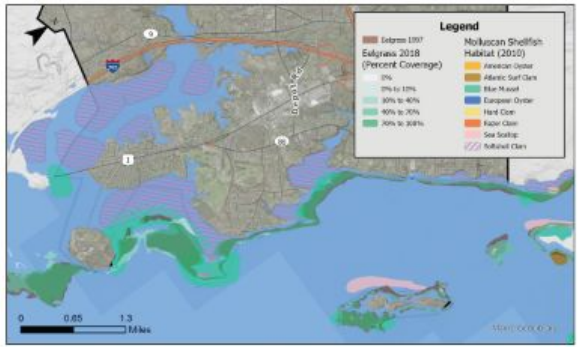


Figure 14: Intertidal habitat along Falmouth's coast. Eelgrass and shellfish habitat are vulnerable to climate change. Data source: Maine DEP

Wastewater Infrastructure

The Town of Falmouth maintains water, sewage, and stormwater infrastructure within town lines. This includes 31 pump stations, roughly 60 miles of pipeline running through private and public ground, and a wastewater treatment plant located along the Presumpscot River. In addition to servicing all the sewer connections and emptying out septic tanks for the Town of Falmouth, the wastewater treatment plant "imports" sewage from roughly 1,000 households from the neighboring Town of Cumberland.

Sea level rise, increased precipitation and increased flooding severity pose new risks to the daily operation and structural integrity of wastewater systems. The Wastewater Department of Falmouth does not believe increased precipitation and storm surges will affect the capacity of pipelines or the wastewater treatment plant. However, increased stormwater can still inundate pump stations and erode pipelines faster.

Asset	HAT + 1.6 feet	HAT + 3.9 feet	100-year flood
Wastewater Treatment Plant	No	No	No
Treatment Outflow Pipe	Yes	Yes	Yes
Pump Stations	0	2	7
Pipeline	2.4%	3.3%	8%
Sewage and Drainage Covers	2.1%	3%	6.8%

Valuable Assets

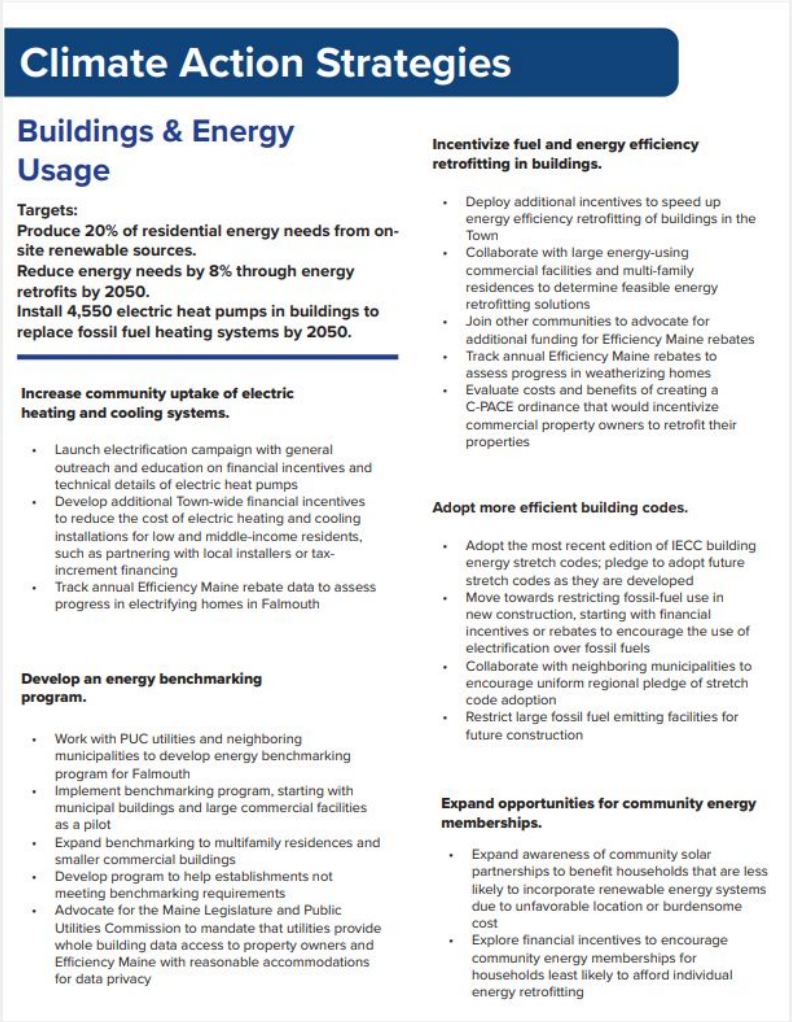
Wastewater Treatment Facility: The wastewater treatment plant is elevated high enough where it won't be directly impacted by sea level rise or flooding. However, sea-level rise threatens the facility's outflow system.

Pump Stations: Up to 7 of Falmouth's pump stations are vulnerable to flooding, 5 along the coast and 2 inland. The high cost and lack of suitable replacement locations (especially in residential areas) makes relocating pump stations challenging.

Pipelines and Manholes: Many miles of existing pipeline are old and degrading in quality. Storm surges and higher annual precipitation may strain the capacity of the piping system. Over 24,000 ft of pipeline is expected to be impacted by increased precipitation and sea level rise based on the amount of pipelines inundated by flooding in the Flood Factor model data.

Develop Climate Action Strategies

- Adopt efficient building codes
- Incentivize fuel and energy efficiency retrofitting in buildings
- Require residential and commercial new construction to have capacity for sustainable energy



Climate Action Strategies

Buildings & Energy Usage

Targets:
Produce 20% of residential energy needs from on-site renewable sources.
Reduce energy needs by 8% through energy retrofits by 2050.
Install 4,550 electric heat pumps in buildings to replace fossil fuel heating systems by 2050.

Increase community uptake of electric heating and cooling systems.

- Launch electrification campaign with general outreach and education on financial incentives and technical details of electric heat pumps
- Develop additional Town-wide financial incentives to reduce the cost of electric heating and cooling installations for low and middle-income residents, such as partnering with local installers or tax-increment financing
- Track annual Efficiency Maine rebate data to assess progress in electrifying homes in Falmouth

Develop an energy benchmarking program.

- Work with PUC utilities and neighboring municipalities to develop energy benchmarking program for Falmouth
- Implement benchmarking program, starting with municipal buildings and large commercial facilities as a pilot
- Expand benchmarking to multifamily residences and smaller commercial buildings
- Develop program to help establishments not meeting benchmarking requirements
- Advocate for the Maine Legislature and Public Utilities Commission to mandate that utilities provide whole building data access to property owners and Efficiency Maine with reasonable accommodations for data privacy

Incentivize fuel and energy efficiency retrofitting in buildings.

- Deploy additional incentives to speed up energy efficiency retrofitting of buildings in the Town
- Collaborate with large energy-using commercial facilities and multi-family residences to determine feasible energy retrofitting solutions
- Join other communities to advocate for additional funding for Efficiency Maine rebates
- Track annual Efficiency Maine rebates to assess progress in weatherizing homes
- Evaluate costs and benefits of creating a C-PACE ordinance that would incentivize commercial property owners to retrofit their properties

Adopt more efficient building codes.

- Adopt the most recent edition of IECC building energy stretch codes; pledge to adopt future stretch codes as they are developed
- Move towards restricting fossil-fuel use in new construction, starting with financial incentives or rebates to encourage the use of electrification over fossil fuels
- Collaborate with neighboring municipalities to encourage uniform regional pledge of stretch code adoption
- Restrict large fossil fuel emitting facilities for future construction

Expand opportunities for community energy memberships.

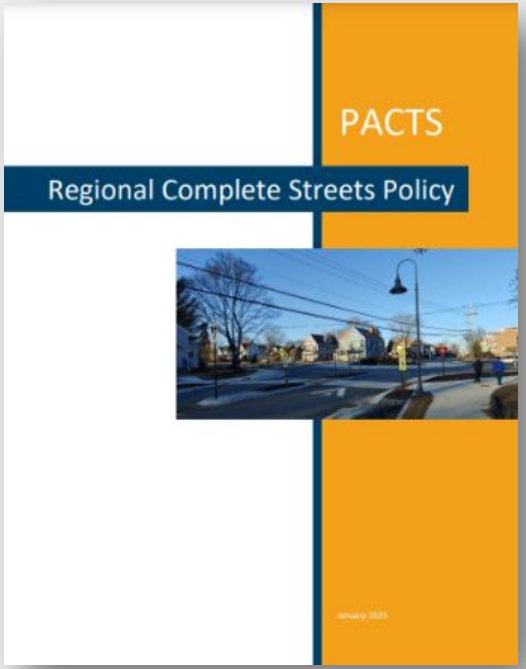
- Expand awareness of community solar partnerships to benefit households that are less likely to incorporate renewable energy systems due to unfavorable location or burdensome cost
- Explore financial incentives to encourage community energy memberships for households least likely to afford individual energy retrofitting

Regional

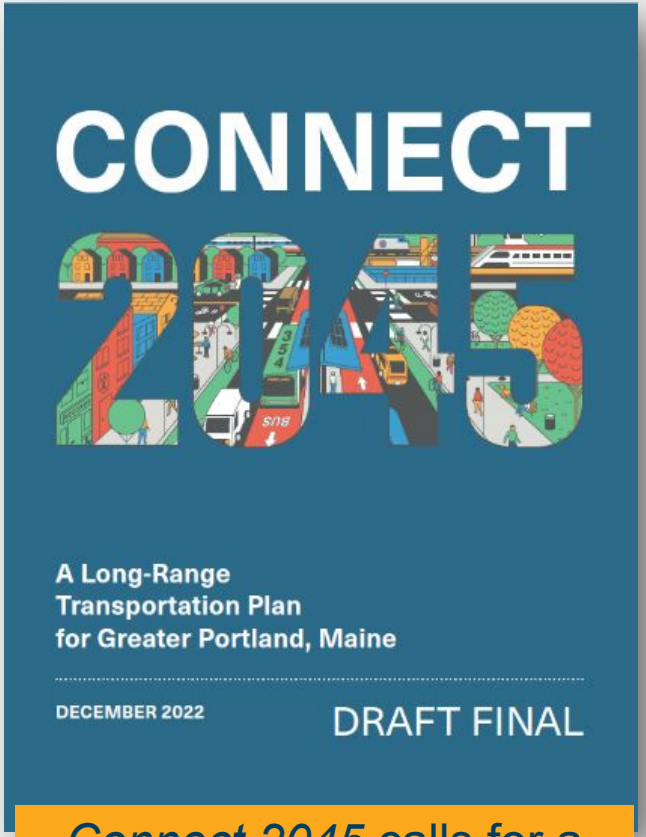
Develop nature-based coastal resilience solutions across Casco Bay Communities

- Identify high priority coastal resilience projects
- Create a regional coastal resilience plan

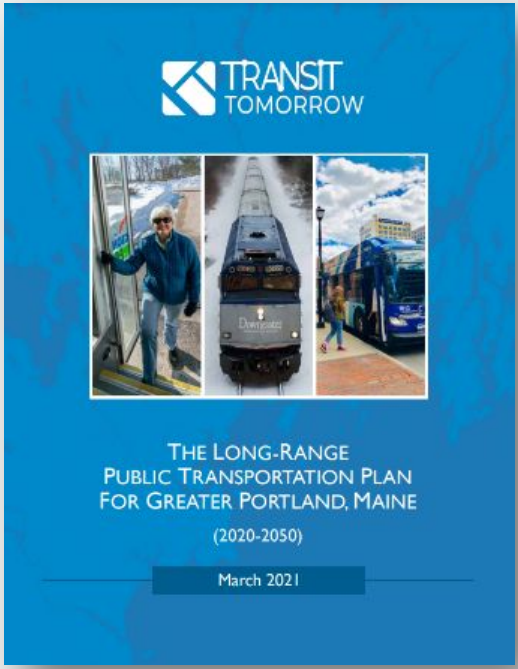
Regional



Design streets to be accessible for all users and abilities regardless of the mode of transportation



Connect 2045 calls for a **70% reduction** in transportation greenhouse gas emissions by 2045



30-year vision for public transportation in Greater Portland

State

MAINE CLEAN COMMUNITIES

Clean Cities

DRIVE ELECTRIC MAINE

Technical & Problem-Solving Assistance

Connection to Funding Opportunities

Local & National Partnerships

Information & Education

EMPOWER WORKPLACE CHARGING


Thank you

Dr. Dave Reidmiller

Director of the Climate Center, Gulf of Maine Research Institute

The Science & Implications of Flood Risk in Casco Bay Communities

Dave Reidmiller, Ph.D.

27 April 2023

Greater Portland Board of Realtors
Sustainability Advisory Group

Gulf of Maine
Research Institute
Science. Education. Community.

Portland: A City (Partly) Built on Fill

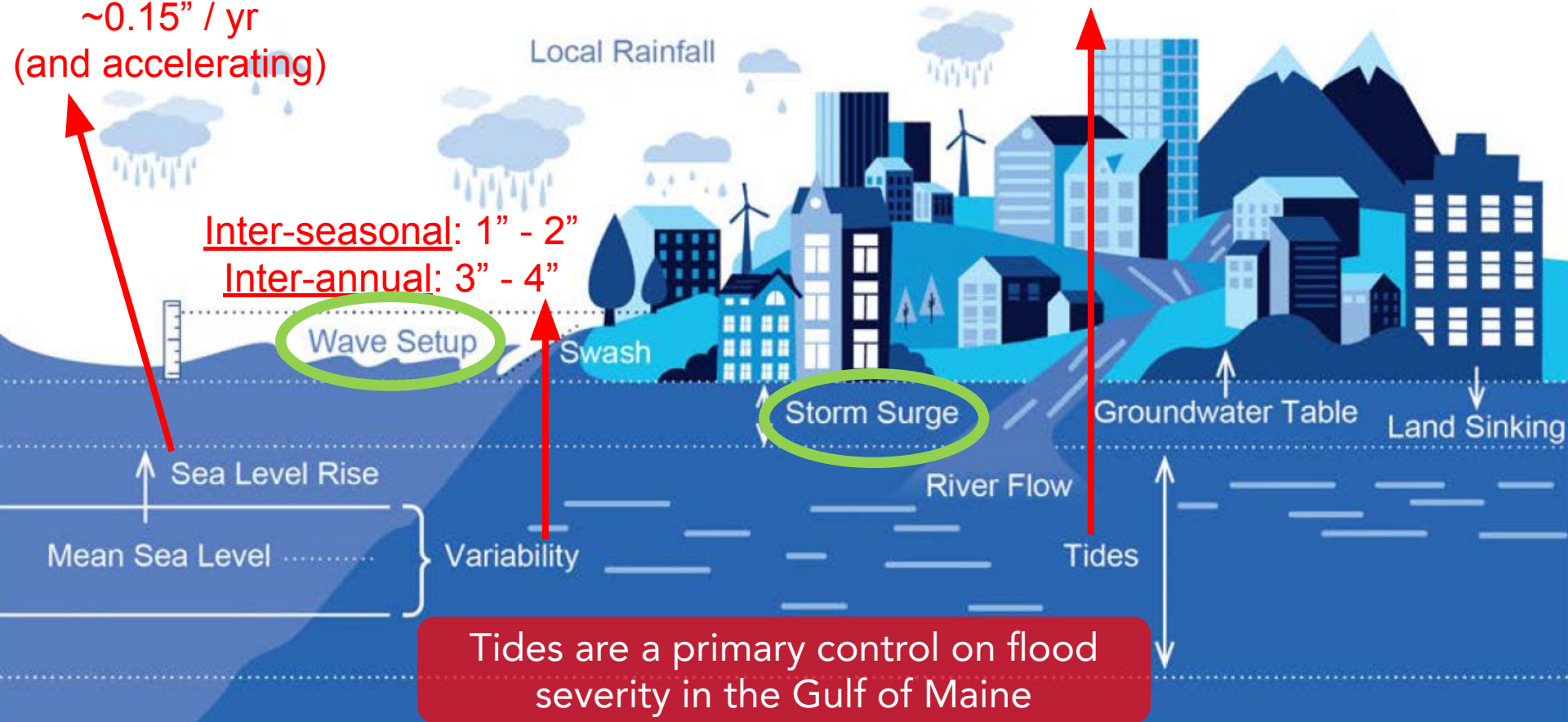
Gulf of Maine Research Institute

Physical drivers of flooding (in Casco Bay)

Gulf of Maine Research Institute

Rate of SLR
~0.15” / yr
(and accelerating)

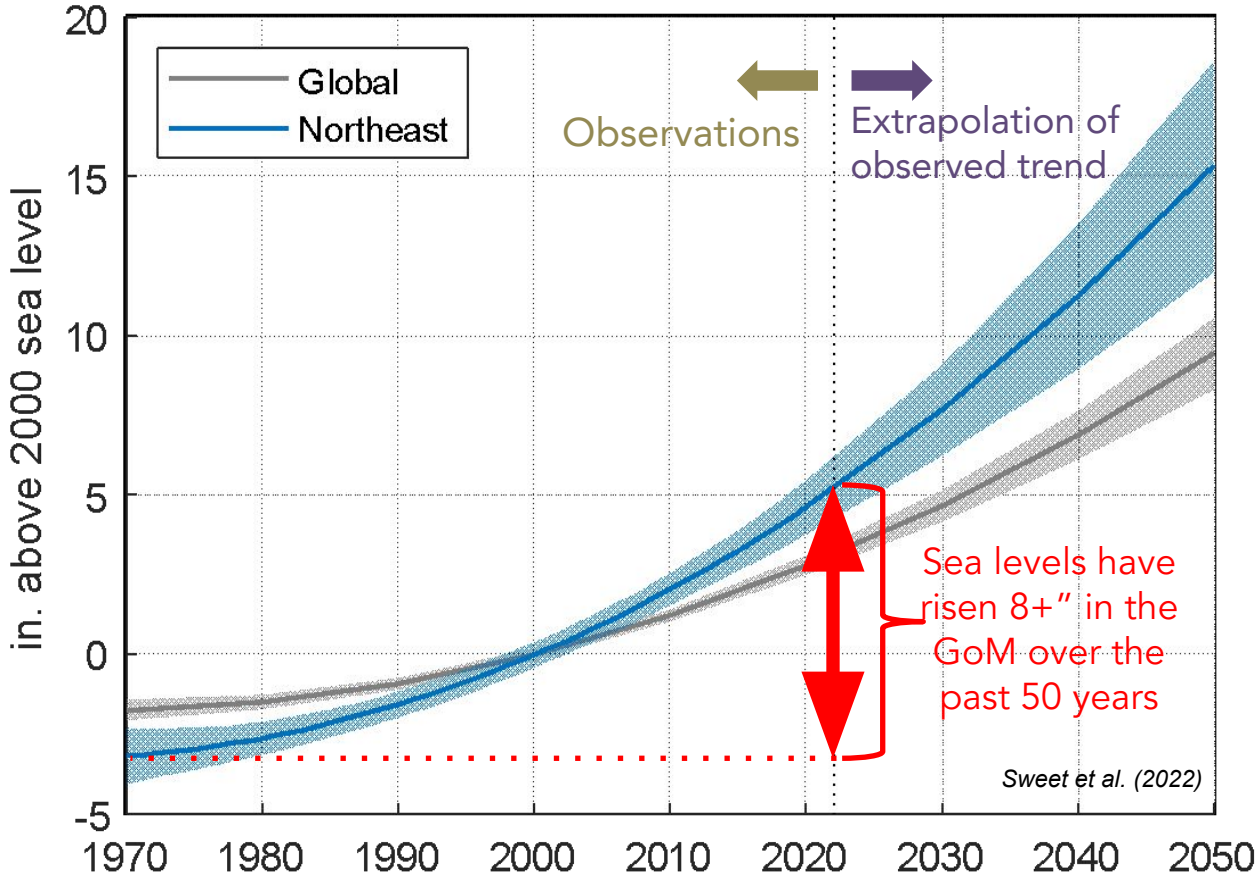
Tidal range: 4.5 to 7 **feet** above MSL

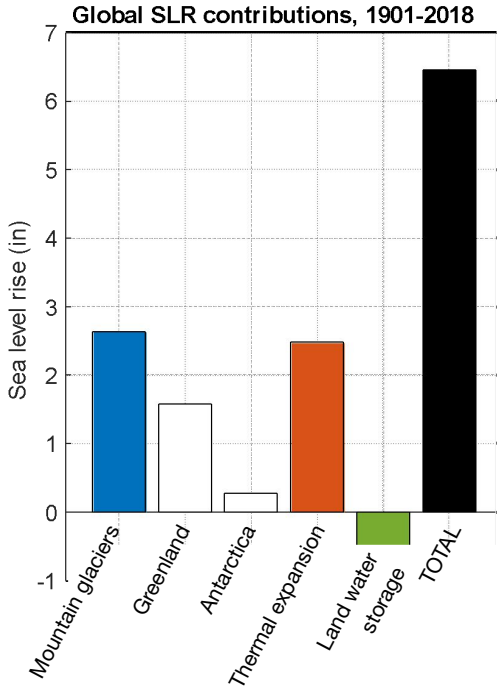


Tides are a primary control on flood severity in the Gulf of Maine

Observed & Projected Sea Level Rise

Gulf of Maine Research Institute

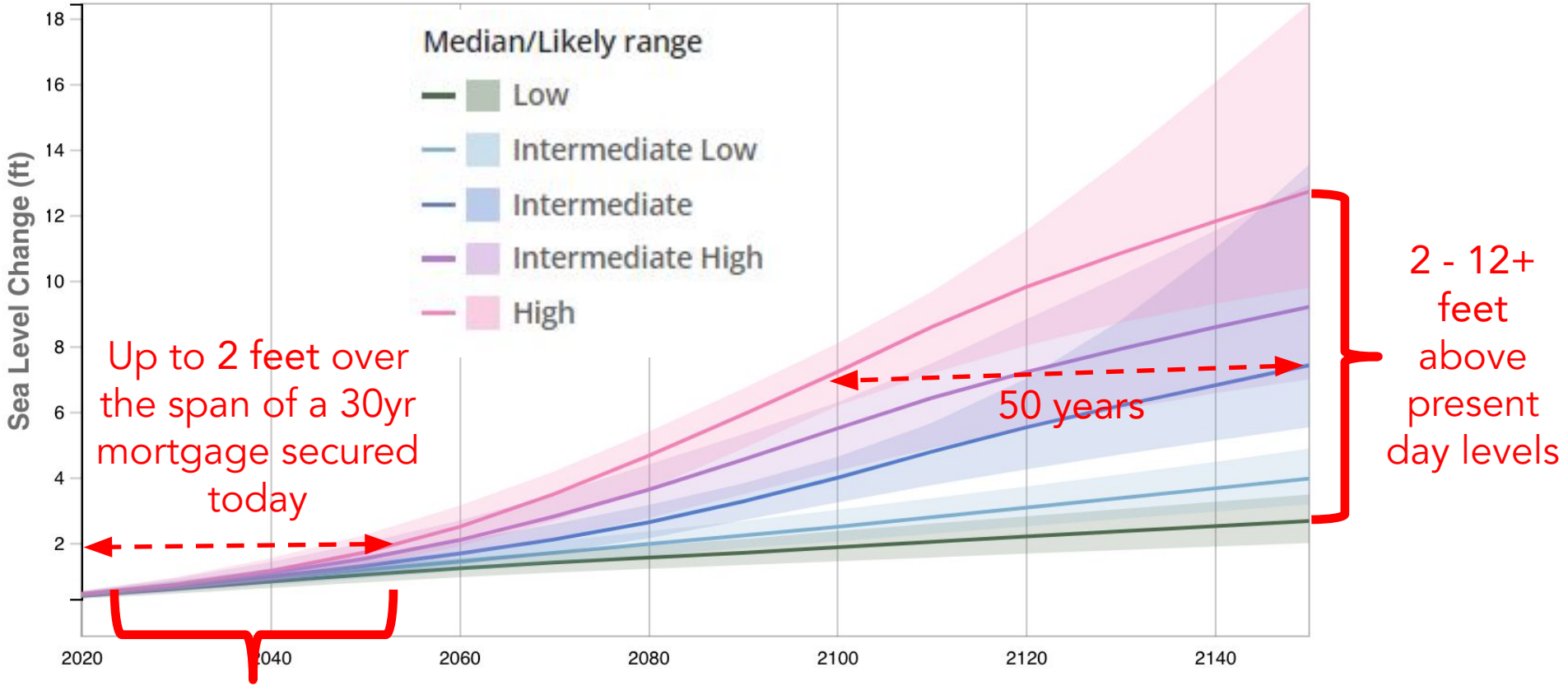




Fox-Kempner et al. (2021)

Projected Sea Level Rise out to 2150

Gulf of Maine Research Institute

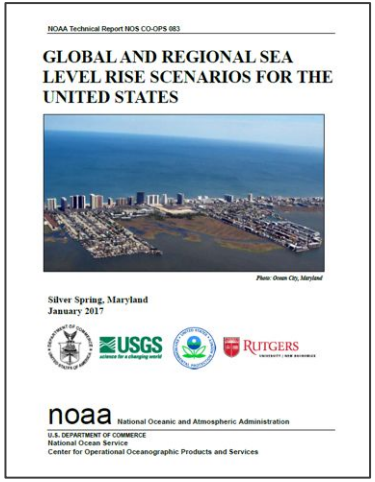


https://sealevel.nasa.gov/task-force-scenario-tool

Codifying SLR Preparedness in Maine Law

Gulf of Maine Research Institute

	2000	2050	2100
"Prepare to Manage"	0 ft	+3.0 ft	+8.8 ft
"Commit to Manage"	0 ft	+1.5 ft	+4.0 ft

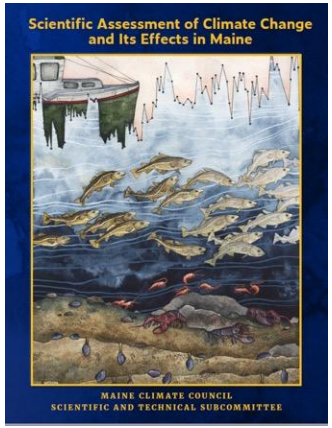

NOAA Technical Report NOS CO-OPS 083

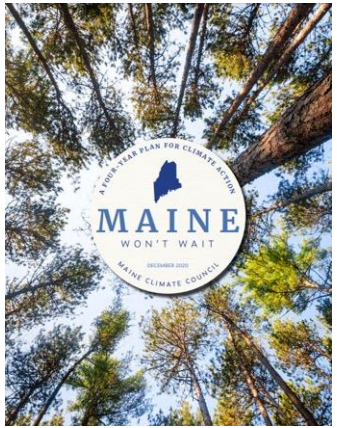
GLOBAL AND REGIONAL SEA LEVEL RISE SCENARIOS FOR THE UNITED STATES

Silver Spring, Maryland
January 2017

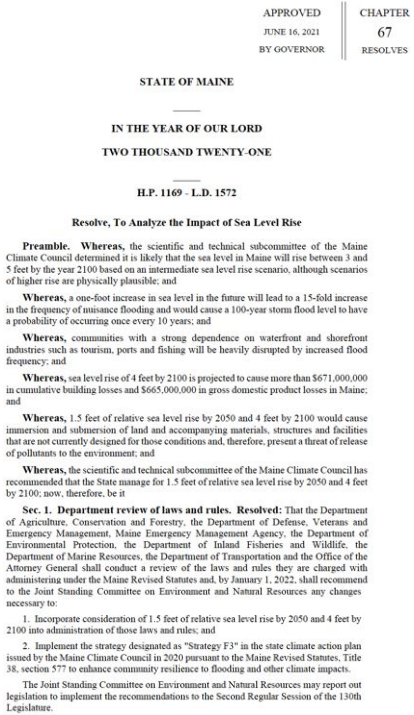
noaa National Oceanic and Atmospheric Administration
U.S. DEPARTMENT OF COMMERCE
National Ocean Service
Center for Operational Oceanographic Products and Services

2017 NOAA Technical Report





Maine Climate Council adopts sea level planning targets based on Scientific and Technical Subcommittee report


APPROVED JUNE 16, 2021 BY GOVERNOR | CHAPTER 67 RESOLVES

STATE OF MAINE

IN THE YEAR OF OUR LORD
TWO THOUSAND TWENTY-ONE

H.P. 1169 - L.D. 1572

Resolve, To Analyze the Impact of Sea Level Rise

Preamble. Whereas, the scientific and technical subcommittee of the Maine Climate Council determined it is likely that the sea level in Maine will rise between 3 and 5 feet by the year 2100 based on an intermediate sea level rise scenario, although scenarios of higher rise are physically plausible; and

Whereas, a one-foot increase in sea level in the future will lead to a 15-fold increase in the frequency of nuisance flooding and would cause a 100-year storm flood level to have a probability of occurring once every 10 years; and

Whereas, communities with a strong dependence on waterfront and shorefront industries such as tourism, ports and fishing will be heavily disrupted by increased flood frequency; and

Whereas, sea level rise of 4 feet by 2100 is projected to cause more than $671,000,000 in cumulative building losses and $665,000,000 in gross domestic product losses in Maine; and

Whereas, 1.5 feet of relative sea level rise by 2050 and 4 feet by 2100 would cause immersion and submersion of land and accompanying materials, structures and facilities that are not currently designed for those conditions and, therefore, present a threat of release of pollutants to the environment; and

Whereas, the scientific and technical subcommittee of the Maine Climate Council has recommended that the State manage for 1.5 feet of relative sea level rise by 2050 and 4 feet by 2100; now, therefore, be it

Sec. 1. Department review of laws and rules. Resolved: That the Department of Agriculture, Conservation and Forestry, the Department of Defense, Veterans and Emergency Management, Maine Emergency Management Agency, the Department of Environmental Protection, the Department of Inland Fisheries and Wildlife, the Department of Marine Resources, the Department of Transportation and the Office of the Attorney General shall conduct a review of the laws and rules they are charged with administering under the Maine Revised Statutes and, by January 1, 2022, shall recommend to the Joint Standing Committee on Environment and Natural Resources any changes necessary to:

1. Incorporate consideration of 1.5 feet of relative sea level rise by 2050 and 4 feet by 2100 into administration of those laws and rules; and

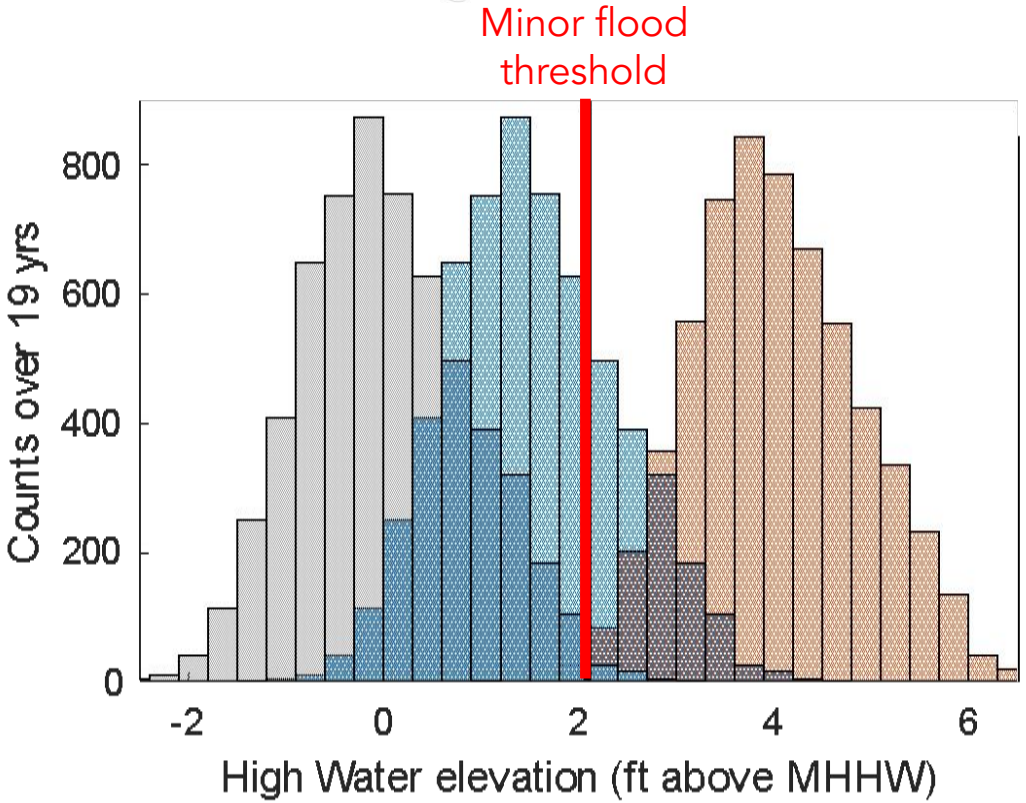
2. Implement the strategy designated as "Strategy F3" in the state climate action plan issued by the Maine Climate Council in 2020 pursuant to the Maine Revised Statutes, Title 38, section 577 to enhance community resilience to flooding and other climate impacts.

The Joint Standing Committee on Environment and Natural Resources may report out legislation to implement the recommendations to the Second Regular Session of the 130th Legislature.

Legal mandate to incorporate "commit to manage" scenarios into state agency regulations

Flooding in Portland under "Commit to Manage"

Gulf of Maine Research Institute



Sea level rise	High tide flooding days per year	Year
+4.0 ft	357–363	2100
+1.5 ft	99–140	2050
0 ft	~3	2000

https://sealevel.nasa.gov/flooding-days-projection/

Mapped Flood Risk: "Commit to Manage" in 2100

Gulf of Maine Research Institute

Highest Astronomical Tide
+ 3.9 feet

Maine Geological Survey

Mapped Flood Risk: "Commit to Manage" in 2100

Gulf of Maine Research Institute

Maine Geological Survey

Union Wharf: December 23, 2022 Storm

Gulf of Maine Research Institute

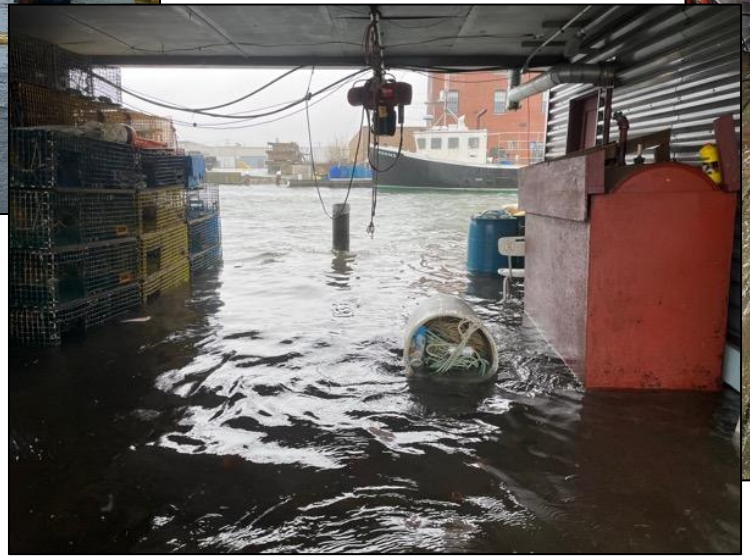
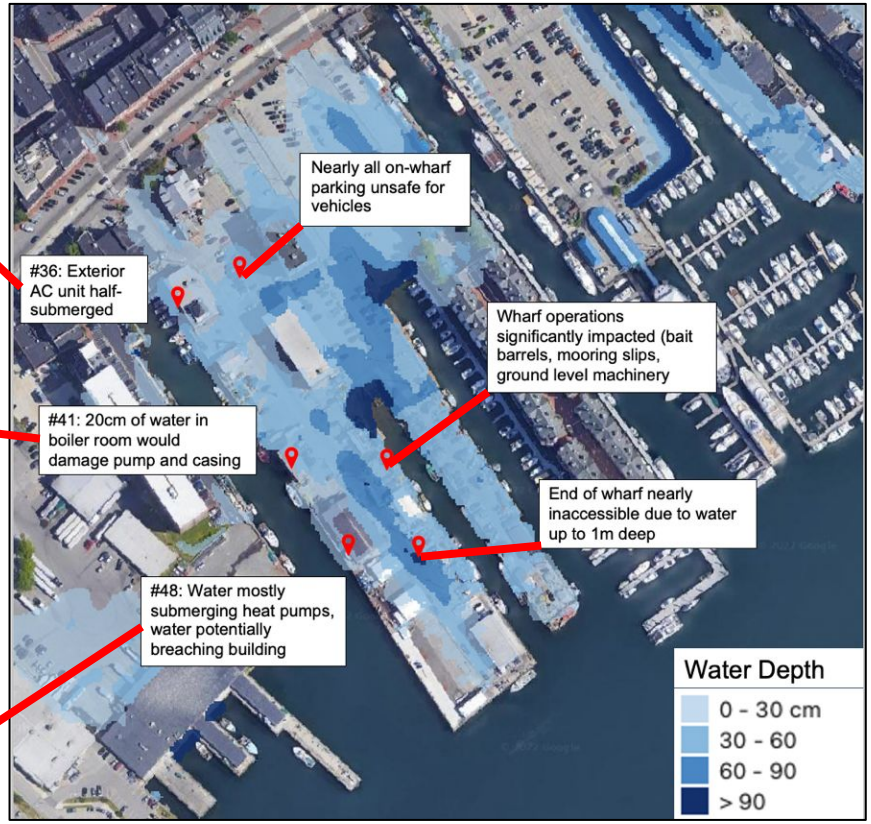


Photo credits: Tim Reich, GMRI

Protecting Union Wharf: Flood Risk Analysis

Gulf of Maine Research Institute

4.6 ft above MHHW
(2031 median 10% annual chance storm tide)



Next step

Create a transferable and replicable process for developing a Union Wharf SLR adaptation strategy that can support climate-smart working waterfronts throughout the region.

Real Estate Market Implications: Flood Risk Disclosure

Gulf of Maine Research Institute

Lack of flood disclosure laws is putting home buyers at risk as extreme storms become more frequent

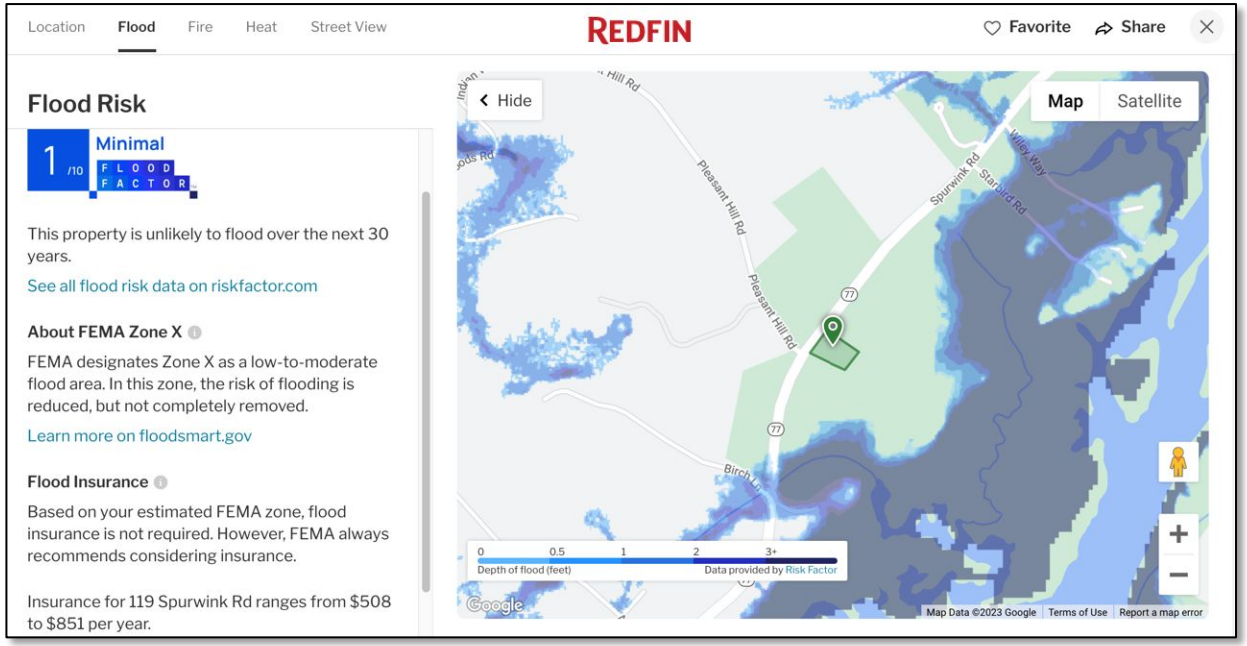
By René Marsh, CNN
Published 7:19 AM EDT, Sat October 1, 2022

CLIMATEWIRE

Flood-battered N.J. poised to enact model disclosure law

It will be the first Northeastern state with strict flood disclosure.

BY: **THOMAS FRANK** | 04/14/2023



- Disclosure laws no longer limited to Gulf states (LA, TX)
- FEMA considering national disclosure requirement

✔ Is property in a flood zone?

✔ Has property flooded in the past?

✔ Has property received any federal flood assistance?

Real Estate Market Implications: Flood Insurance

Gulf of Maine Research Institute

Natl Flood Insurance Program

- Solvent through 2004
- Has since amassed >$20B in debt
- Pricing methodology not updated in 50 yrs

FEMA

Risk Rating 2.0

- More equitable premiums (some increased, some decreased)
- Based on value of home, new flood maps, & unique flood risk
  - ✔ Frequency
  - ✔ Multiple flood types
  - ✔ Distance to water source,
  - ✔ Property characteristics [elevation]
  - ✔ Cost to re-build

CLIMATEWIRE

Hundreds of thousands drop flood insurance as rates rise

By Thomas Frank | 08/17/2022 06:25 AM EDT

Private flood insurance doubles after centurylong lull

BY: **THOMAS FRANK** | 03/13/2023

Roaring wildfires push Colo. to create insurance program

Colorado will become the first state in 41 years to create a state-chartered insurer for people who are denied coverage elsewhere. The public could face financial consequences.

BY: **THOMAS FRANK** | 04/20/2023

Real Estate Market Implications: New Building Codes

Gulf of Maine Research Institute

CLIMATEWIRE

FEMA requires buildings to be elevated after disasters

The FEMA policy will increase rebuilding costs slightly but is likely to save money and possibly lives in the long term by preventing buildings from sustaining repeated flood damage.

BY: **THOMAS FRANK** | 06/16/2022

Justin Sullivan/Getty Images

CLIMATEWIRE

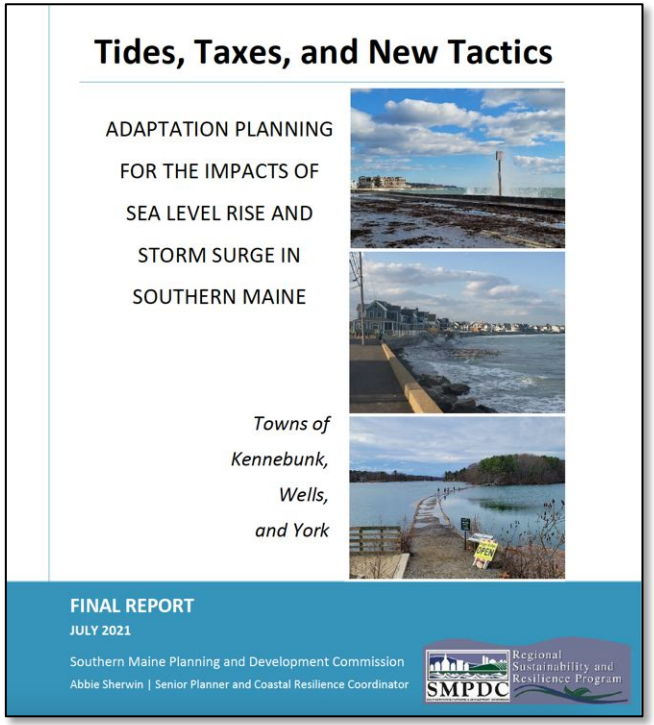
HUD conditions new building finance on flood precautions

The department plans to require new and renovated buildings that it funds to be elevated above flood levels.

BY: **THOMAS FRANK** | 03/27/2023

Real Estate Market Implications: Property Tax Rates

Gulf of Maine Research Institute



Flooding Scenario	Town	Total # Parcels at Risk	Assessed Value at Risk	% of Town-wide Value at Risk	Property Tax at Risk *	% of 2020 Town Budget at Risk ^
1.6 ft	Kennebunk	466	$110 M	4%	$1.9 M	12%
	Wells	2077	$433 M	13%	$4.8 M	21%
	York	1025	$102 M	2%	$1.1 M	5%
3.9 ft	Kennebunk	719	$330 M	12%	$5.8 M	36%
	Wells	2611	$755 M	22%	$7.9 M	35%
	York	2316	$358 M	7%	$3.7 M	17%
6.1 ft	Kennebunk	870	$489 M	18%	$8.6 M	53%
	Wells	2789	$1,081 M	32%	$11.3 M	50%
	York	2823	$555 M	11%	$5.8 M	26%

* = Based on 2020 municipal tax rate of $17.50 (Kennebunk), $10.48 (Wells), and $11.10 (York) per thousand

^ = based on property taxes at risk

It's not just the physical erosion of the coastline, but the potential economic erosion of municipal tax bases (… which may affect rates for remaining property owners)

SMPDC

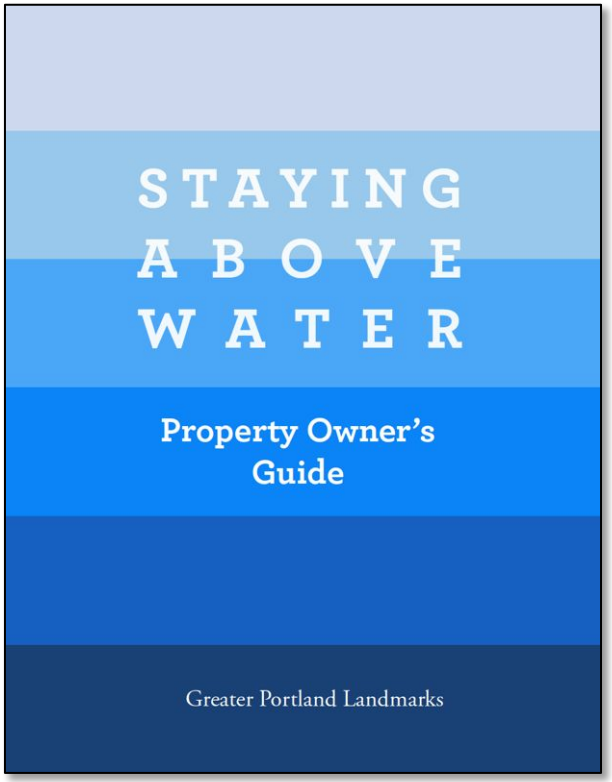
Response Options: Individual vs. Community?

Gulf of Maine Research Institute

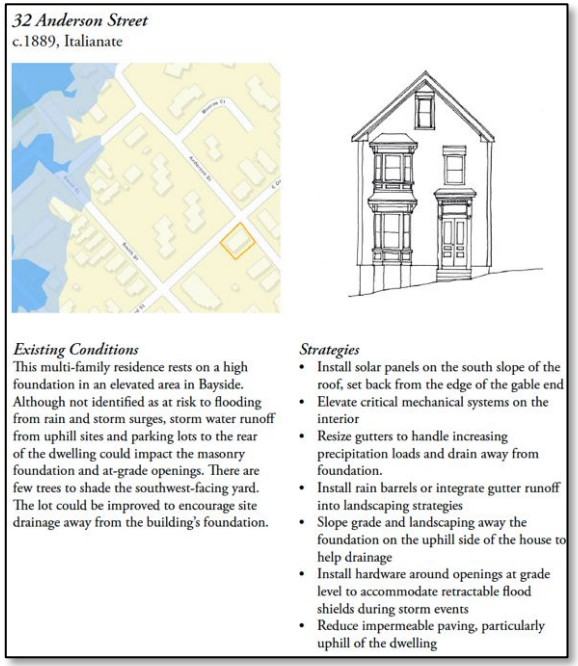
- Inclusive & Transparent Processes for Prioritization
- Climate-Smart Coastal & Land Use Planning
- Adaptation Engineering & Living Shorelines

A Resource for (Historic) Homeowners

Gulf of Maine Research Institute



Bayside Neighborhood
Portland

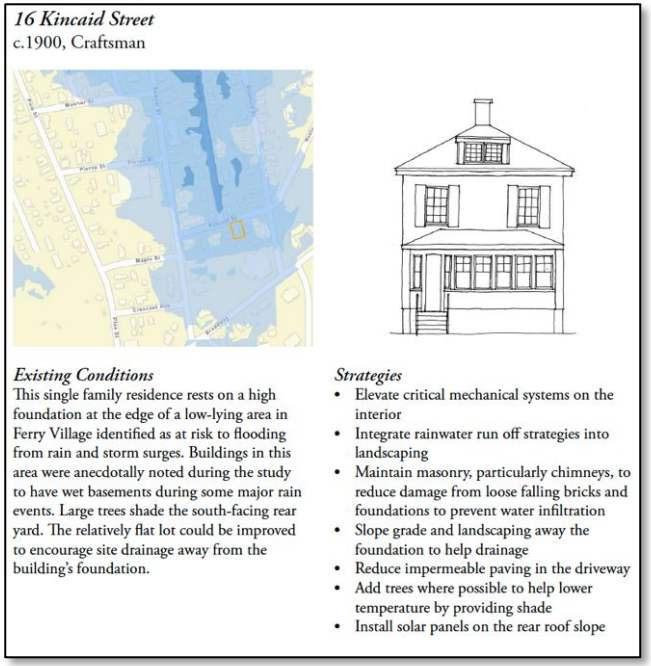


32 Anderson Street
c.1889, Italianate

Existing Conditions
This multi-family residence rests on a high foundation in an elevated area in Bayside. Although not identified as at risk to flooding from rain and storm surges, storm water runoff from uphill sites and parking lots to the rear of the dwelling could impact the masonry foundation and at-grade openings. There are few trees to shade the southwest-facing yard. The lot could be improved to encourage site drainage away from the building's foundation.

Strategies
- Install solar panels on the south slope of the roof, set back from the edge of the gable end
- Elevate critical mechanical systems on the interior
- Resize gutters to handle increasing precipitation loads and drain away from foundation.
- Install rain barrels or integrate gutter runoff into landscaping strategies
- Slope grade and landscaping away the foundation on the uphill side of the house to help drainage
- Install hardware around openings at grade level to accommodate retractable flood shields during storm events
- Reduce impermeable paving, particularly uphill of the dwelling

Ferry Village Neighborhood
South Portland



16 Kincaid Street
c.1900, Craftsman

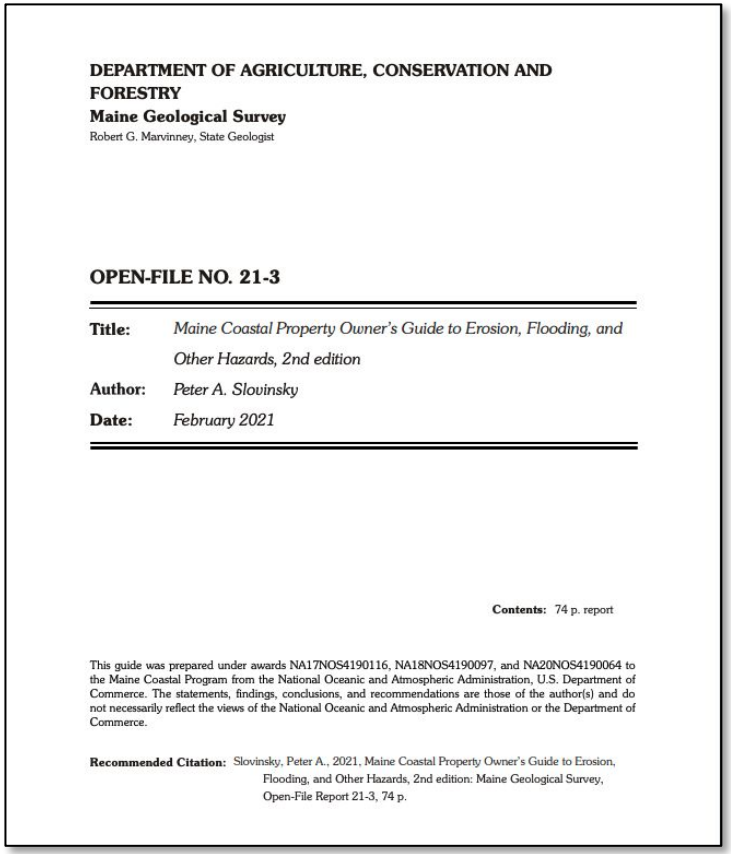
Existing Conditions
This single family residence rests on a high foundation at the edge of a low-lying area in Ferry Village identified as at risk to flooding from rain and storm surges. Buildings in this area were anecdotally noted during the study to have wet basements during some major rain events. Large trees shade the south-facing rear yard. The relatively flat lot could be improved to encourage site drainage away from the building's foundation.

Strategies
- Elevate critical mechanical systems on the interior
- Integrate rainwater run off strategies into landscaping
- Maintain masonry, particularly chimneys, to reduce damage from loose falling bricks and foundations to prevent water infiltration
- Slope grade and landscaping away the foundation to help drainage
- Reduce impermeable paving in the driveway
- Add trees where possible to help lower temperature by providing shade
- Install solar panels on the rear roof slope

www.portlandlandmarks.org/publications

A State Resource for Coastal Property Owners

Gulf of Maine Research Institute



DEPARTMENT OF AGRICULTURE, CONSERVATION AND FORESTRY
Maine Geological Survey
Robert G. Marvinney, State Geologist

OPEN-FILE NO. 21-3

Title: *Maine Coastal Property Owner's Guide to Erosion, Flooding, and Other Hazards, 2nd edition*
Author: *Peter A. Slovinsky*
Date: *February 2021*

Contents: 74 p. report

This guide was prepared under awards NA17NOS4190116, NA18NOS4190097, and NA20NOS4190064 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 the author(s) and do not necessarily reflect the views of the National Oceanic and Atmospheric Administration or the Department of Commerce.

Recommended Citation: Slovinsky, Peter A., 2021, Maine Coastal Property Owner's Guide to Erosion, Flooding, and Other Hazards, 2nd edition: Maine Geological Survey, Open-File Report 21-3, 74 p.

Beaches, Dunes, and Coastal Erosion and Flooding Hazards Response Actions				
Action	**Pros**	**Cons**	**Effort**	**Cost**
Do Nothing	No to low cost; easy to implement	Must accept a level of risk; uncer-	Low	$
Avoid Hazardous Area	Reduces hazard to new structures; part of design phase	Applicable to new construction only; site constraints	Low	$
Design and build properly	Reduces hazards to new structures; part of design phase	Applicable to new construction only; site constraints	Low-Mod	$-$$
Elevate or relocate	Reduces hazards to structures	Site constraints; hard and expensive to elevate or relocate large struc- tures	Mod-High	$$-$$
Manage overwash and litter	Easy to implement	None	Low	$
Manage seaweed	Easy to implement; aids dune growth	None	Low	$
Use dune fencing	Easy to implement, aids dune growth	Must be maintained seasonally	Low	$
Use cobble-trapping fencing	Reduces impacts to structures	Limited to cobble-dominated systems; need to be maintained	Low-Mod	$-$$
Build or change dune access	Reduces impacts to dunes and structures	Site constraints; must work with neighbors; permitting	Low-Mod	$-$$
Restore or create sand dunes	Reduces impacts to structures using green approaches	Site and timing constraints; permitting; must be maintained	Low-Mod	$-$$
Beach scraping	Reduces impacts to structures using green approaches	Temporary response; site and timing constraints; permitting	Low-Mod	$-$$
Beach nourishment	Reduces impacts to structures using green approaches; creates habitat	Costly; permitting; site and timing constraints	Mod-High	$$-$$$

www.maine.gov/dacf/mgs/hazards/chg/index.html

Thank You!

dreidmiller@gmri.org
gmri.org/climate

Gulf of Maine
Research Institute

Science. Education. Community.

Julie Rosenbach

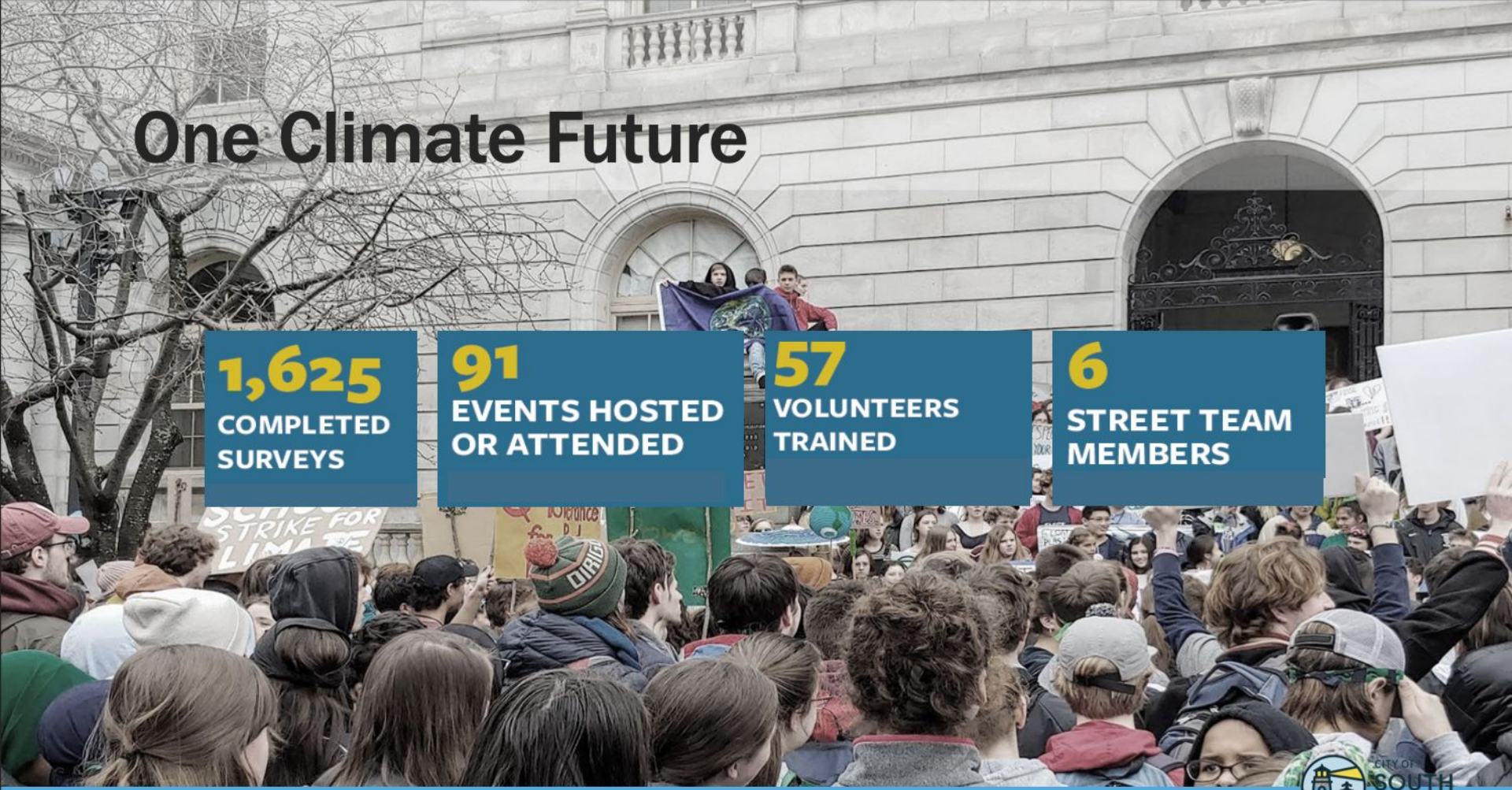
Director of Sustainability, South Portland

Climate Goals

In 2018 Portland & South Portland adopted bold climate goals:

- ✓ Use 100% clean, renewable energy for municipal operations by 2040
- ✓ Reduce greenhouse gas (GHG) emissions citywide 80% by 2050
- ✓ Build the resilience of our neighborhoods, infrastructure, and ecosystems to the impacts of climate change

One Climate Future



CITY OF SOUTH PORTLAND

Strategies

BE Buildings and Energy

WR Waste Reduction

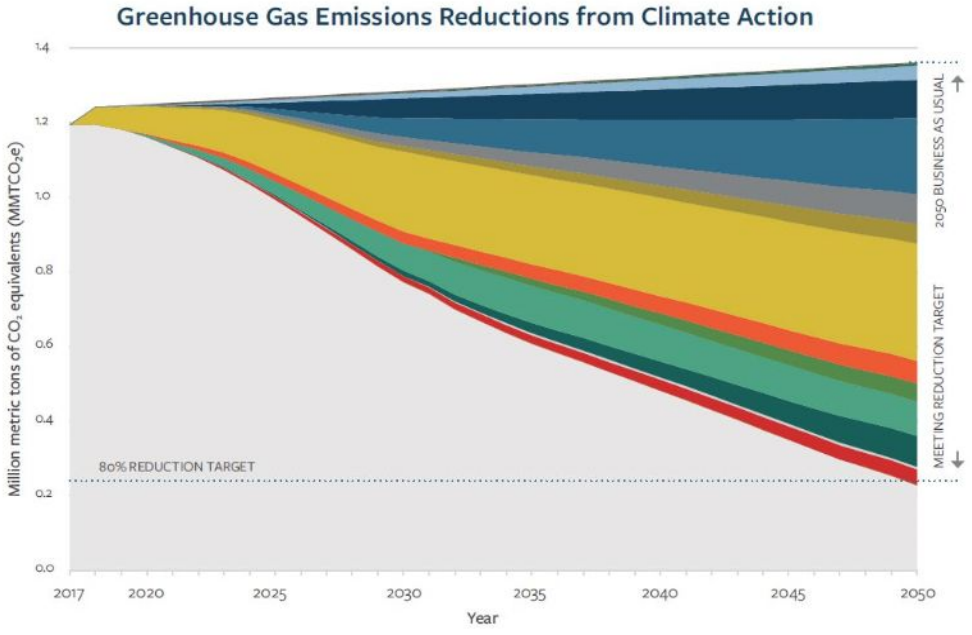
TLU Transportation and Land Use

CR Climate Resilience

CITY OF SOUTH PORTLAND

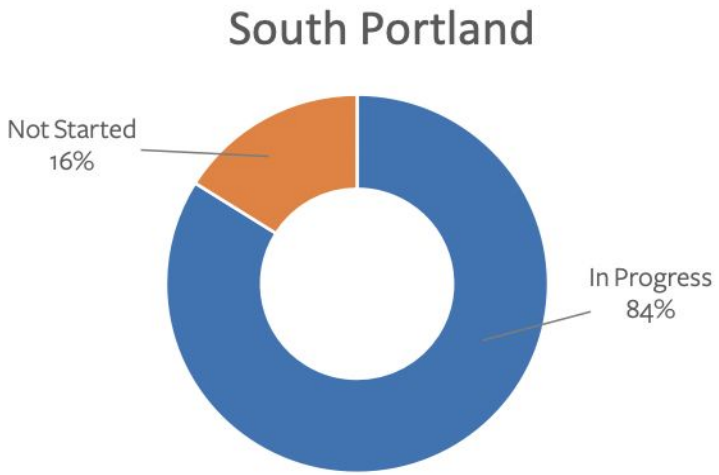
Emissions Reductions

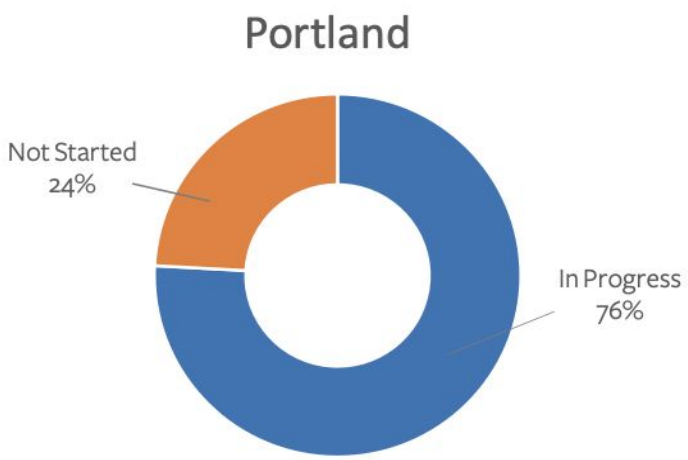
Based on the energy and emissions modeling, the One Climate Future actions can reduce our cities' emissions by over 81% by 2050, relative to 2017.



CITY OF SOUTH PORTLAND

Progress to Date





Focus Areas

Buildings & Energy Use

Transportation & Land Use

Waste Reduction

Climate Resilience

CITY OF SOUTH PORTLAND

Buildings & Energy Use

Noteworthy Milestones

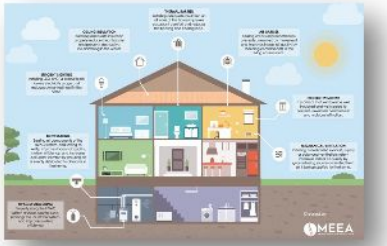
- ✓ All new buildings to be net zero energy starting in 2030.
- ✓ All municipal electricity use met by renewable energy by 2032.
- ✓ Replace 80% of natural gas and heating oil use in residences with ASHPs and HWHPs by 2050.

CITY OF SOUTH PORTLAND

Buildings & Energy Use

Renewable Portfolio Standard

Energy Stretch Code



Benchmarking Ordinance

Electrify Everything!

C-PACE

Solar Arrays

CITY OF SOUTH PORTLAND

Climate Resilience

Noteworthy Milestones

- ✓ No new incompatible, vulnerable, or hazardous uses built in areas of high flood risk by 2026.
- ✓ All city residents have access to tools to assess future flood risk by 2026.
- ✓ All residents live within a half mile of a park or open space by 2035.

CITY OF SOUTH PORTLAND

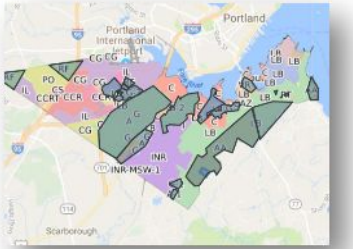
Climate Resilience

Landcare Management Ordinance

Dynamic flood inundation model

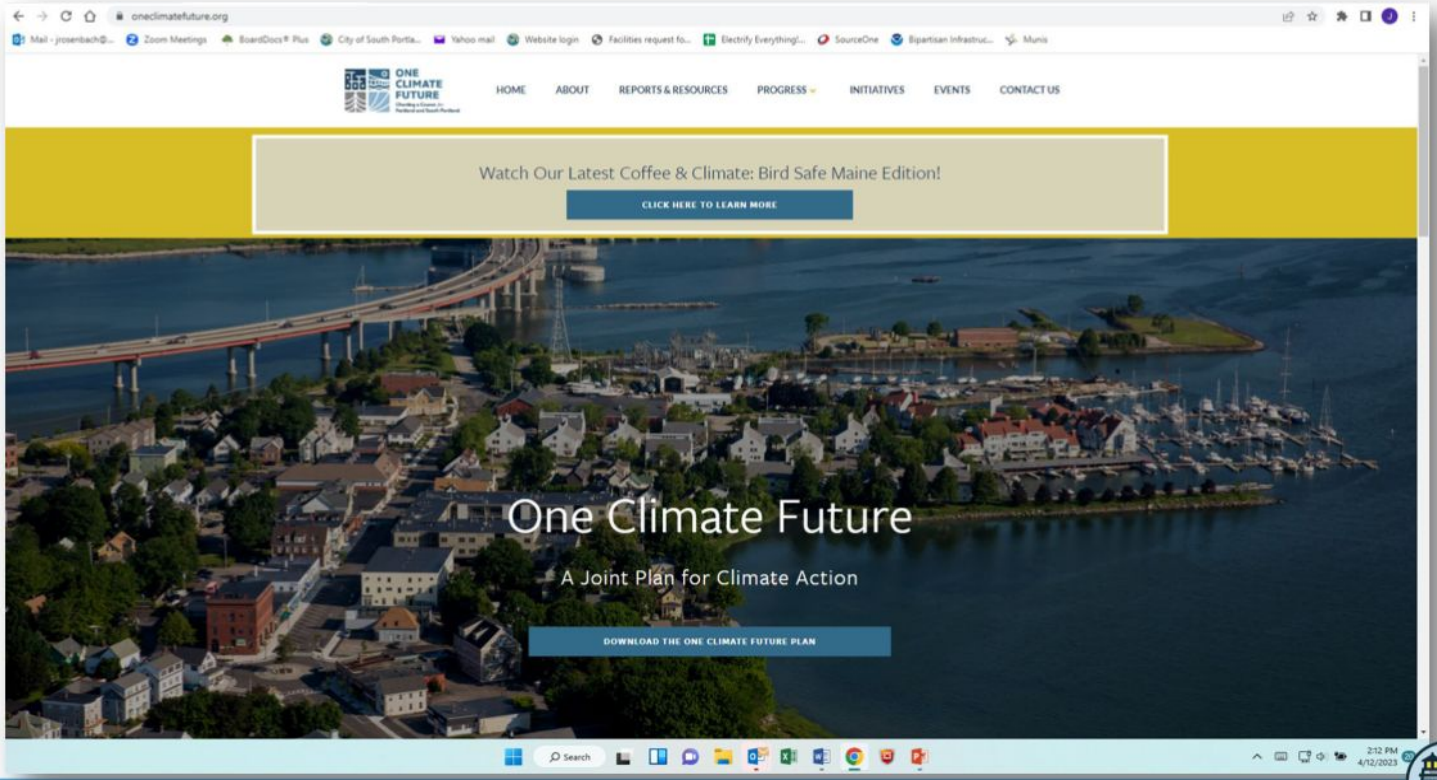
Tree Protection Ordinance

Climate resilience zoning overlay



100 Resilient Yards program

oneclimatefuture.org



CITY OF SOUTH PORTLAND

Jesse Lamarre-Vincent

Town of Cumberland Lands and Conservation Commission (LCC) CLimate Action Planning Committee

Town of Cumberland Sustainability Presentation for the Sustainability Advisory Group

Overview Sustainability Actions at the Town Level

- Comprehensive Plan
- Conservation Subdivision ordinance
- Town Solar Array
- Police Department EV
- Heat Pumps on Town Property
- Creating the Climate Action Planning/Sustainability Subcommittee in 2019

Cumberland Climate Action Plan (CAP)

- Climate Action Planning subcommittee for the Town of Cumberland Lands and Conservation Commission formed in November 2019
- Two phases, a plan for the town and a plan for residents
- Surveys of town residents and businesses to get input on priorities
- Both plans delivered and approval by Town Council

CAP for Town of Cumberland Highlights (⅓)

- Zero emissions at the Town Level by 2030

- Develop a MSAD 51 solar farm.

- Install industrial scale heat pumps to supplement natural gas heating and mitigate the GHG effects of natural gas heating.

CAP for Town of Cumberland Highlights (⅔)

- Phase in EV or plug-in hybrid automobiles, light duty vehicles and school buses
- Set aside a 225-acre forest carbon reserve from town-owned woodlands.
- Design and build new public buildings to a zero-carbon standard.
- Make available 5-10 acre parcels of town-owned land to market gardeners.

CAP for Town of Cumberland Highlights (3/3)

- Develop a tree planting program for public ways and easements.

- Engage MSAD 51 staff to integrate sustainability principles and the CAP into K-12 curricula.

- Delegate to the Town staff the duty to annually analyze and report the GHG emissions generated within Cumberland.

Climate Action Plan for Residents Highlights (½)

- Reduce GHG emissions from home energy use – promote heat pumps
- Reduce GHG from transport
- Adopt ecologically productive landscaping practices
- Support 30X30 goal of conserving 30% Cumberland's lands by 2030

Climate Action Plan for Residents Highlights (2/2)

- Buy low-cost carbon offsets from Town owned forest lands
- Install low cost photovoltaic
- Decrease food waste through composting
- Adopt the 2021 IECC “stretch” energy efficiency goal for new construction

Sustainability Subcommittee actions going forward

- Increasing Town Composting and Recycling
- Promoting EV and Heat Pump adoption
- Sustainable Landscaping Education
- Develop a Community Demonstration Orchard

Thanks for listening!

Happy to take any questions.

Julia Bassett Schwerin

Advisors Living Real Estate and Co-Chair, Sustainability Advisory Group of the Greater Portland Board of REALTORS®, Co-Producer and Moderator

Sustainability Matters: Community Unity ©

Julia Bassett Schwerin
Maine Green Broker and Realtor®, Advisors Living Real Estate

- Green Broker Designation, National Association of Realtors® 2011
- Global Luxury Broker Certified 2009
- Smart Home Certified 2018®
- Resort, Second Home, Waterfront and Investment Property Certified
- Accredited Buyer Representative Certified
- Director, Greater Portland Board of Realtors® and Maine Assoc. of Realtors®
- Advisor, NorthEast Energy Efficiency Partnerships/DOE HELIX Program
- Member, Passive House Maine, 2022
- Member, Maine Real Estate Development Association, 2017
- Co-Chair, Sustainability Advisory Group, Greater Portland Board of Realtors® 2019
- Founder, Agents for the Built Environment, an advocacy group, 2019
- Member, Maine Building Energy Code Coalition, Maine Coalition for Clean Energy

Sustainability Matters: Community Unity

Community Survey	
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Thank you to Alexander Price, Pierce Atwood, for conducting our survey!!

Sustainability Matters: Community Unity

Community Survey	Sustainability Coordinators
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	Level 2 Chargers
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	DC Fast Chargers
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	EVs in Fleet
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	PV Solar
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	Storage Batteries
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	Air Source Heat Pumps
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	Solar Hot Water
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	Geothermal HP
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	Rated Buildings
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	Food/Yard Waste
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	Pesticide Ban
Cape Elizabeth	
Cumberland	
Falmouth	
Portland	
South Portland	
Scarborough	
Freeport	

Sustainability Matters: Community Unity

Community Survey	Community Resilience Partnership
Cape Elizabeth	
Cumberland	$25k
Falmouth	$121k
Portland	$67k
South Portland	$100k
Scarborough	$46k
Freeport	

Sustainability Matters: Community Unity

Brian Ambrette, Senior Climate Resilience Coordinator, Maine Governor's Office of Policy Innovaton and the Future (GOPIF)

Kelly Rehberg, Sustainability Program Manager, Greater Portland Council of Governments

Dr. Dave Reidmiller, Director of the Climate Center, Gulf of Maine Research Institute

Julie Rosenbach, Director of Sustainability, South Portland

Jesse Lamarre-Vincent, Town of Cumberland Lands and Conservation Commission (LCC) Climate Action Planning Subcommittee