



PENOBSCOT
CLIMATE ACTION

Climate Vulnerability Assessment Community

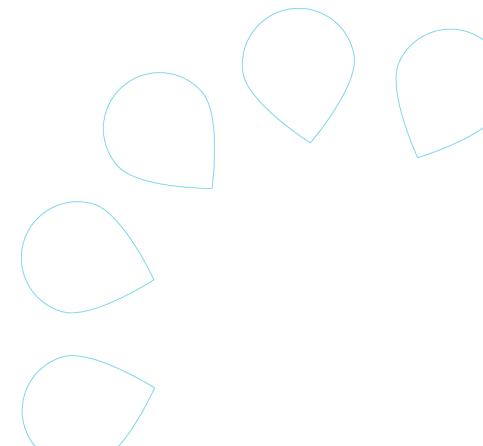
Workshop with BACTS Policy Committee

SEPTEMBER 20, 2022



Agenda

- Project background & purpose of workshop (5 min)
- Introductory discussion (10 min)
- Initial projections and exposure assessment (15 min)
- Reactions and feedback discussion (25 min)
- Summarizing top issues (10 min)

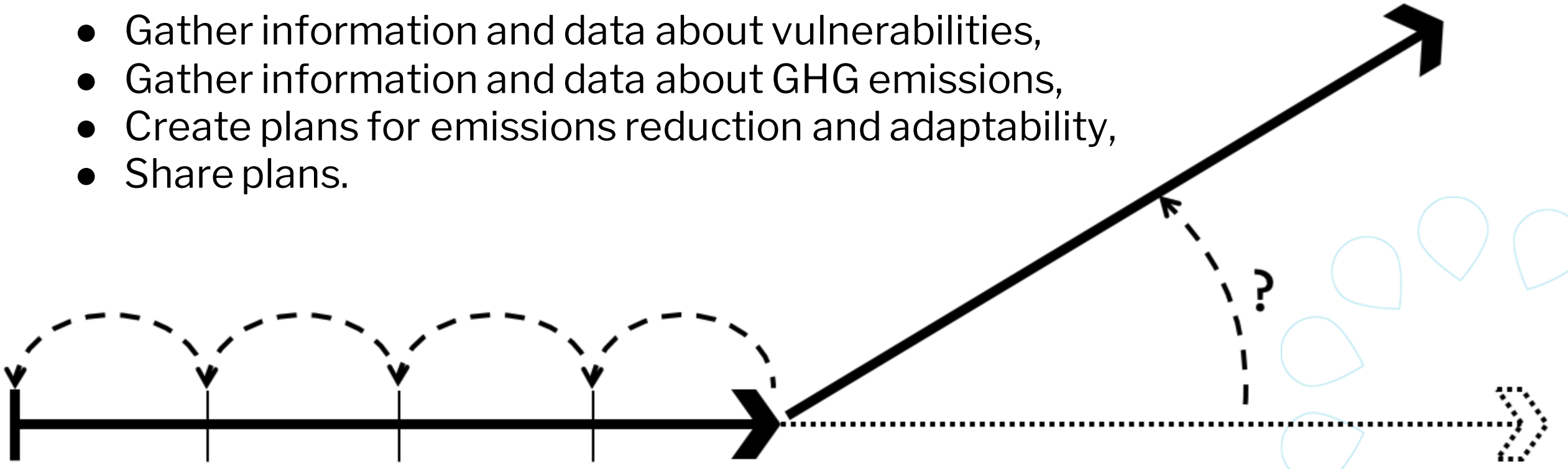




Penobscot Climate Action

Building the capacity in people, communities, and natural systems to evolve, and thrive in the face of disruptions.

- Gather information and data about vulnerabilities,
- Gather information and data about GHG emissions,
- Create plans for emissions reduction and adaptability,
- Share plans.





Project Overview

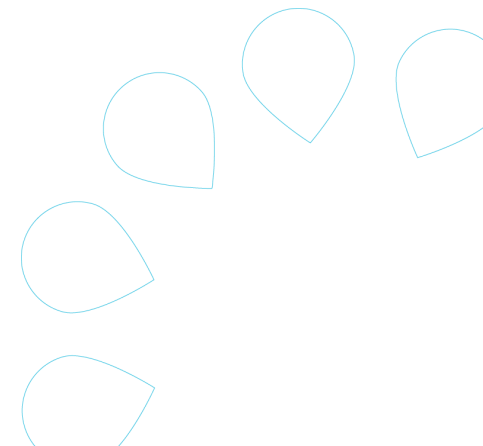
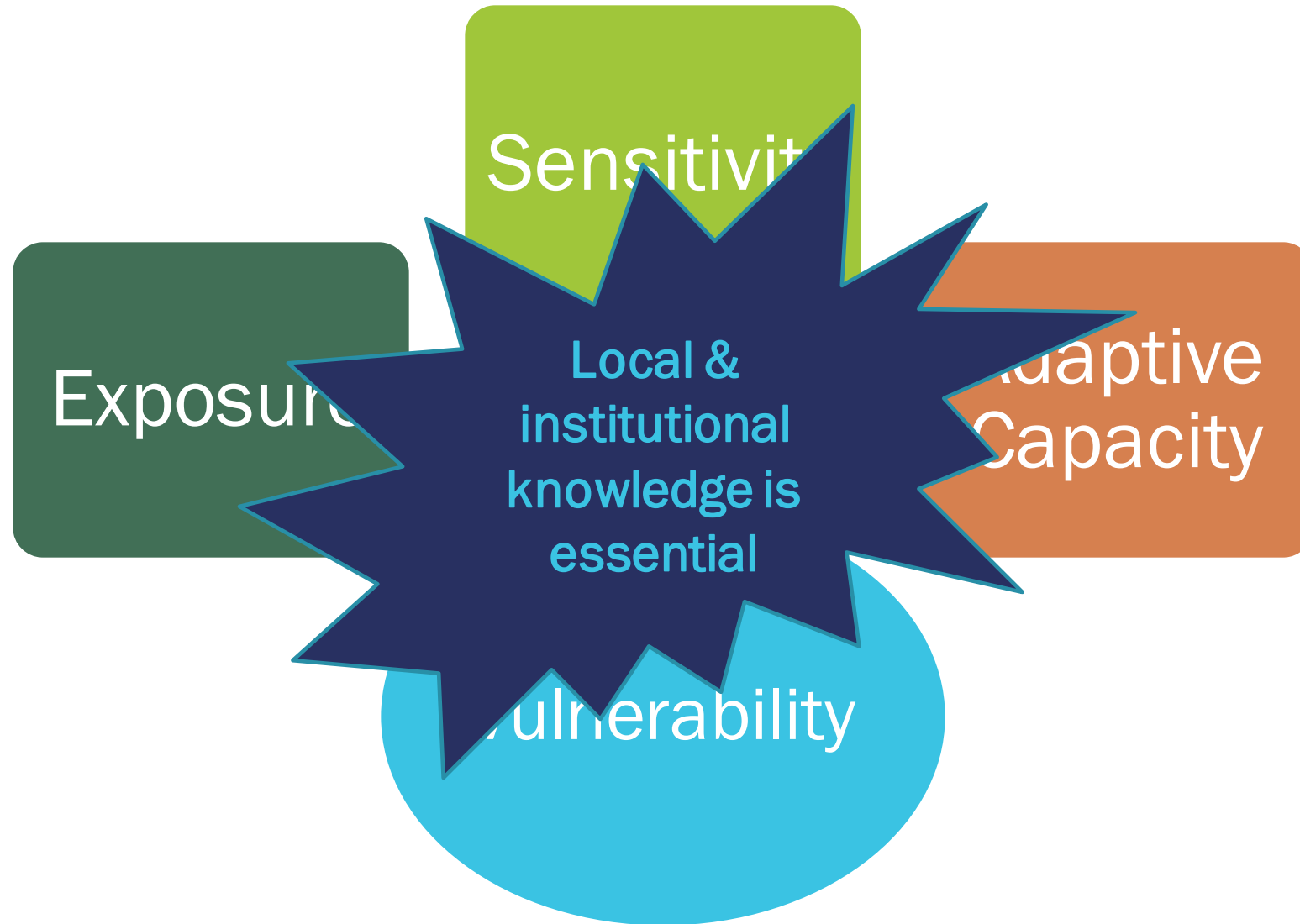
			Phase I (2022)						Phase II (2023 Estimated/Subject to Change)								
	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Baseline Assessment																	
GHG Inventory						D		F									
Climate Vulnerability Analysis						D		F									
Presentation of Results							★										
Climate Action & Adaptation Plan					SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Public Engagement & Advisory Committee					★					★			★			★	
Strategy Development																F	
Climate Action & Adaptation Plan															D	D	F
Presentation of Results																	★

- ★ Meeting
- D Draft Deliverable
- F Final Deliverable





Workshop Purpose





Introductory Discussion

(10 Minutes in Small Groups)

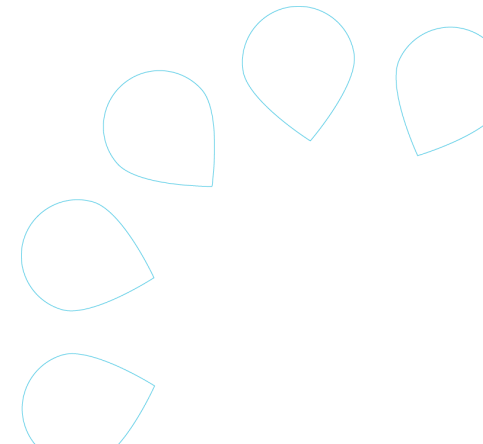
What is your name, role, area of responsibility?

Values

- What people, places, assets, or systems are of the most importance to your work?

What changes are you seeing?

- Are changing weather patterns impacting your work?
- Do you have concerns about changing weather/climate and its potential impacts on your work or your community?





Expected Changes

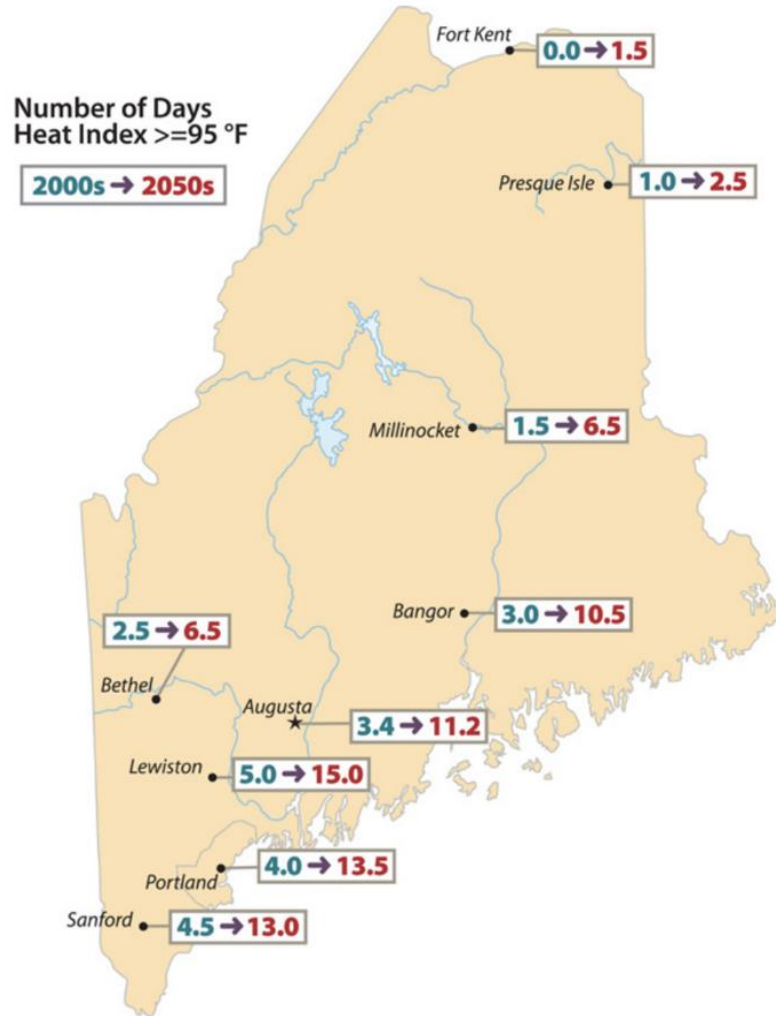
- Temperature
- Precipitation
- Flooding
- Drought
- Storms





Warmer Temperatures

More Very Hot Days



Seasonal Shifts

Average date of last Spring frost is 6.7 days earlier (May 10 → May 4).



Average date of first Fall frost is 9.1 days later (Sept. 27 → Oct 6).



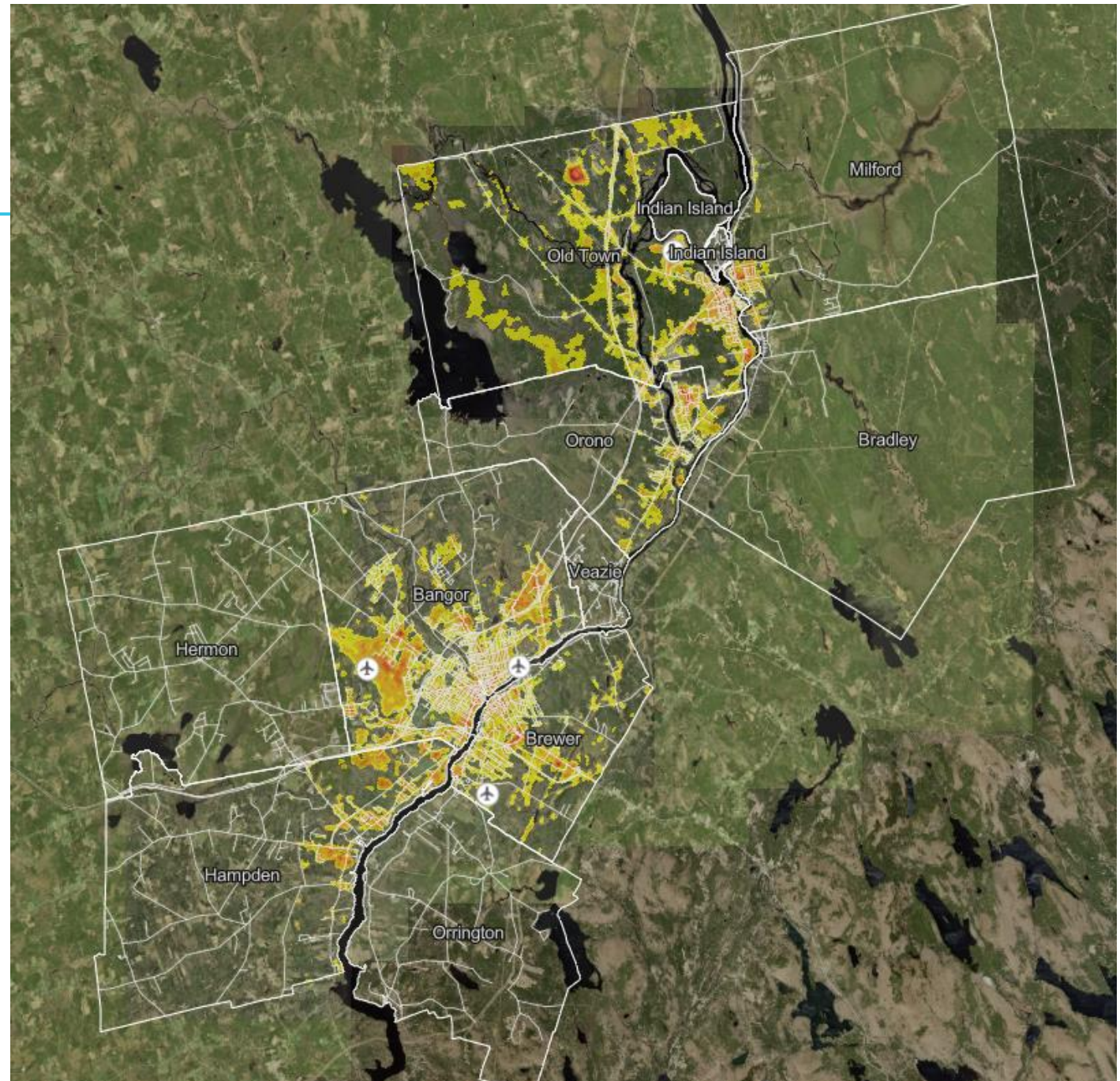
Heat Islands

Approximately 10% of region's land area is "heat island."

The heat island effect results in:

- daytime temperatures ~ 1–7° F higher than in outlying areas
- nighttime temperatures about 2–5° F higher

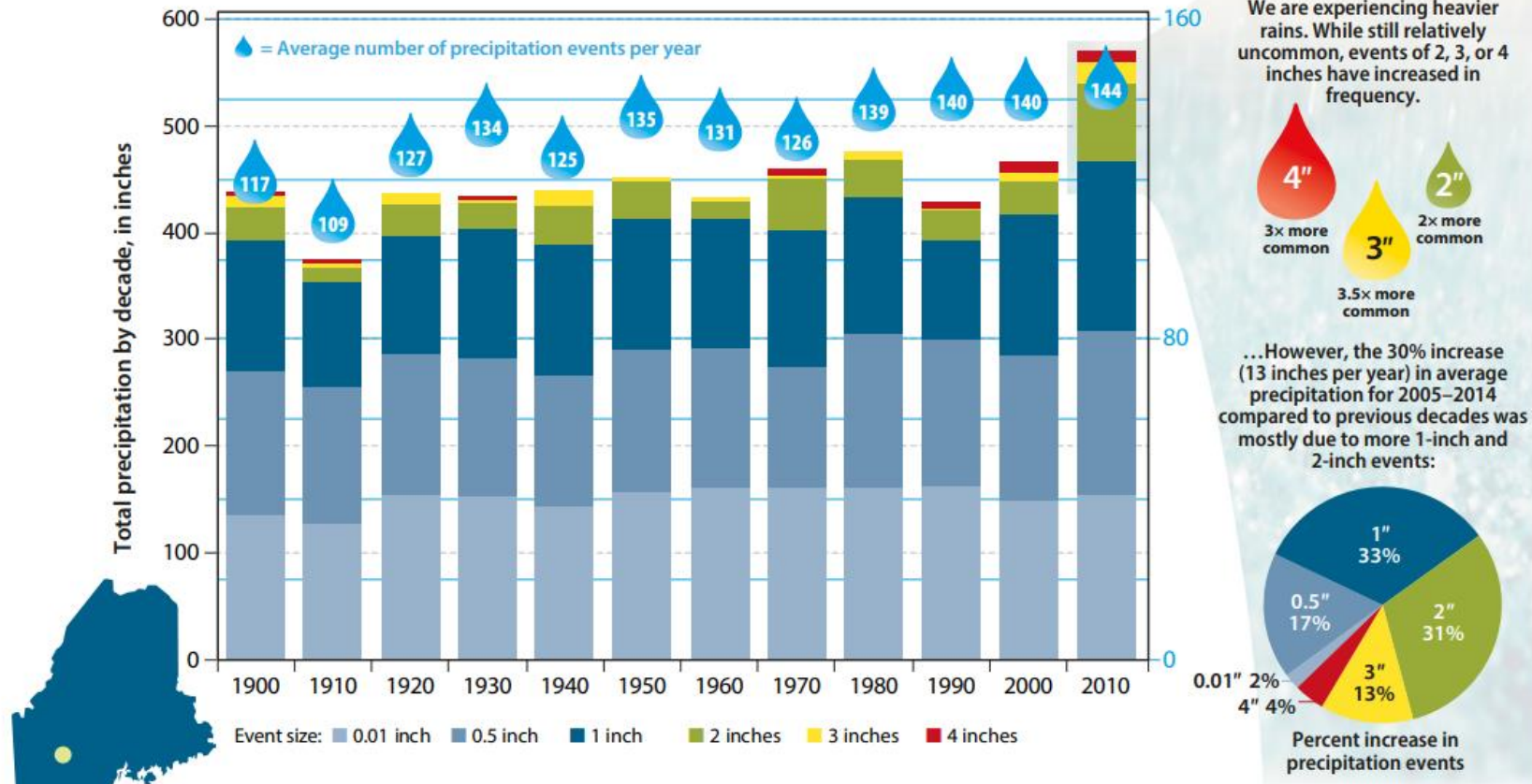
Source: US EPA





More Variable and Intense Precipitation

Precipitation at Farmington, Maine

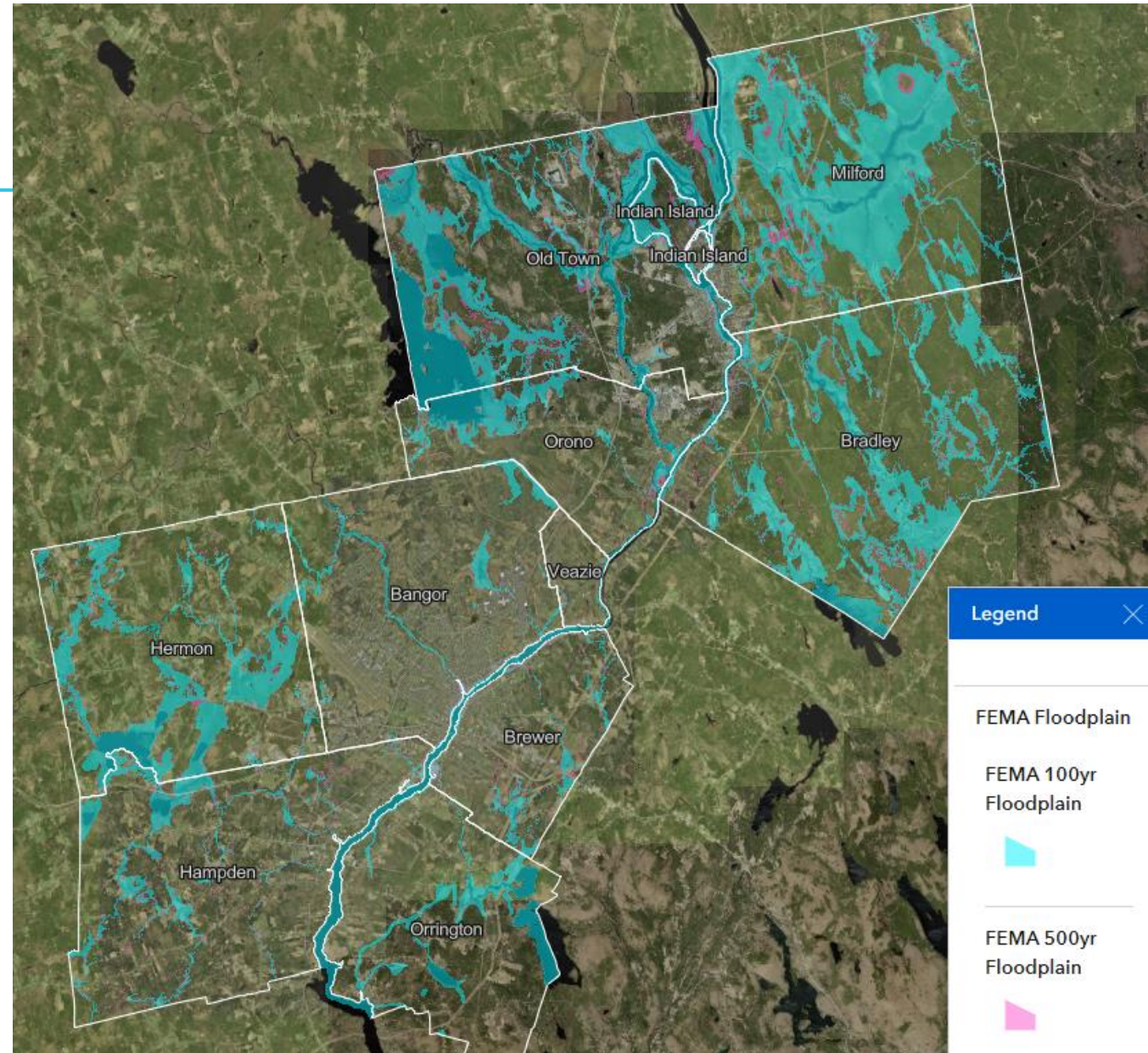


Total decadal precipitation and mean annual number of precipitation events for Farmington, Maine calculated from daily precipitation values, 1895–2014. Precipitation events are defined as days with measurable (>0.01 in) rain or water equivalent snow. Each bin represents a 10-year mean, centered on the year specified (i.e., 1900 represents data from 1895–1904). Data from the NOAA Global Historical Climatology Network (NOAA GHCN).

Flooding (FEMA Floodplain)

- For riverine environments, projected 45% increase in 100-year floodplain by 2100¹

Source: AECOM for FEMA, <https://aecom.com/fema-climate-change-report/> (national average)



*Some communities are showing Preliminary FEMA FIRM maps and are for review and guidance purposes only.

Flooding (Sea Level Rise)

By Year	“Commit to Manage”	“Prepare to Manage”
2050	1.5 ft	3.0 ft
2100	3.9 ft	8.8 ft

Recommendation of Maine’s Scientific and Technical Subcommittee to Maine Climate Council



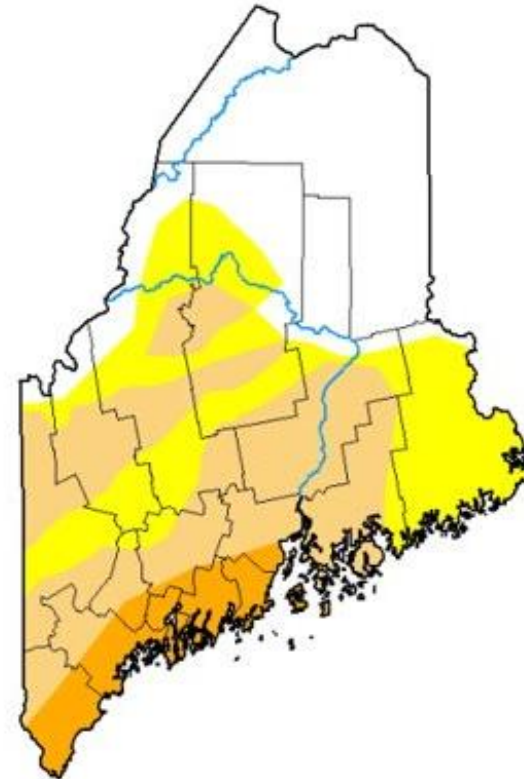


Drought

- Increased average temperatures → increased evaporation in the summers
- Dry months become drier
- More extreme wet to dry fluctuations
- Reduced snowpack

U.S. Drought Monitor Maine

August 2, 2022
(Released Thursday, Aug. 4, 2022)
Valid 8 a.m. EDT



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <http://droughtmonitor.unl.edu/About.aspx>

Author:

Curtis Riganti
National Drought Mitigation Center



droughtmonitor.unl.edu



Storms

- Challenging to project but likely more frequent/severe storms due to increased heat and moisture in the atmosphere
- Severe summer storms – thunderstorms, windstorms, hurricanes, tornadoes
- Severe winter storms – heavier snowfall, more mixed precipitation and ice storms

“Children born in 2020 will experience a 2-7x increase in exposure to extreme events and heat waves in the world they will live in compared to people born in 1960, even accounting for current climate pledges for reductions in GHG emissions.”





Select Identified Exposures / Risks

Roads/Bridges	Airport	Rail	Bus Stops/Routes
<ul style="list-style-type: none"> Roads/bridges where Kenduskeag and Penobscot rivers intersect (near-term SLR exposure) Many roads in floodplain, especially northern and western parts of region 	<ul style="list-style-type: none"> Bangor Intl - No flood exposures; moderate heat island 	<ul style="list-style-type: none"> Bangor Yard – near-term flood exposure (1.2ft SLR; 100-year floodplain); heat island (4) Old Town Yard – 100-year floodplain; heat island (4) Railway passes through 100-year floodplain in several areas 	<ul style="list-style-type: none"> Various intersects with floodplain; routes predominantly in heat islands (Bangor, Brewer)



Select Identified Exposures / Risks

Waste & Wastewater	Energy	Public Safety
<ul style="list-style-type: none"> • Brewer Wasterwater Treatment Facility (37 Oak St) – 100-year floodplain; late century SLR/storm surge exposures • No solid waste facilities are in mapped areas of flood vulnerability 	<ul style="list-style-type: none"> • 3 power plants in 100-year floodplain (Brookfield Black Bear Hydro plants in Milford, Old Town, Orono) • 1 electric substation exposed to later century SLR (Stillwater B in Old Town); none in high heat islands • 3 fuel terminals in floodplain & late-century SLR exposure (Bangor, Brewer, Hampden) 	<ul style="list-style-type: none"> • 3 Fire Stations (all Bangor) in moderate/minimal flood hazard areas (Zone "X") • 8 of 16 National Emergency Shelter Facilities (across Bangor, Old Town, Brewer, Veazie, Milford, Indian Island, Hermon, Orono) in moderate/minimal flood hazard areas (Zone "X"); 7 Shelters in heat island (3-5)



Select Identified Exposures / Risks

Schools	Healthcare
<ul style="list-style-type: none"> • 20% of Child Care Centers & 45% of K-12 schools in heat island (3-5) • 20 Schools in moderate/minimal flood hazard areas (Zone "X") 	<ul style="list-style-type: none"> • Urgent Care Facilities: 2 (Bangor) in moderate/minimal flood hazard areas (Zone "X"), 1 (Bangor) in heat island (4) • 24 of 27 Pharmacies (throughout Old Town, Bangor, Brewer, Indian Island, Orono, Hampden) in heat island (3-5) • 50% of Nursing Homes (Bangor, Orono, Brewer) in heat island (3) • Hospitals (St. Joseph, Acadia, Eastern ME, VA Clinic) in in moderate/minimal flood hazard areas (Zone "X"); several in heat island (3-4)



Additional Projected Effects

- 10% more emergency department visits and deaths on extremely hot days (95 ° F) versus moderate days (75 ° F)
 - Approximately 56% of homes in Penobscot County have air conditioning
- Disruptions to winter recreation and tourism season – particularly for skiing and snowmobiling
- Greater tick (deer tick and lone star tick) and mosquito activity, which carry diseases such as Lyme Disease, anaplasmosis, babesiosis, and West Nile Virus (WNV), as well as the rise of other invasive species and pests
 - High pest activity can lead to closures and cancellations



Additional Projected Effects

- Earlier arrival (spring) and increased duration of pollen season, leading to increased severity of asthma and hay fever
- 45% of Maine's population relies on wells – implications for power outages and drought
- More frequent supply chain disruptions due to global severe weather events



Impacts and Preparedness Questions

- What are your reactions to this data?
- What have been impacts to people, operations, infrastructure in past/recent severe weather events?
- How do you think your infrastructure will be impacted by these projected changes?
- Are there existing response plans, preventative maintenance plans, or storm hardening measures in place?
- What other information would it be helpful for us to know about the region/your work for our vulnerability assessment?

The background features several light blue, teardrop-shaped outlines that resemble leaves or petals, scattered across the dark blue background. These shapes are of varying sizes and orientations, creating a subtle, organic pattern.

Thank you

Katie Kemen

Director of Climate Resilience Services

BSC Group

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