Maine Climate Council

Scientific and Technical Subcommittee Meeting

October 27, 2023

AGENDA

1:00	**1:15**	**Welcome** • **Welcome, logistics, zoom protocols** • **Update on WG, Steering, MCC** • **Plan for today's discussions**
1:15	2:30	**Subgroup Presentations and Discussion** • **What was your process?** • **What is your status and timeline?** • **Are there science highlights to report at this time?** Sequence: 1. Climate 2. Forestry 3. Biodiversity 4. Human Dimensions 5. Agriculture and Food Systems 6. Marine
2:30	2:45	**BREAK**
2:45	3:15	**Discussion** • What do people feel about what they are hearing? • What issues are there about process or content? • Other reflections?
3:15	3:30	**Next Steps** • Subgroups • Jess/Co-Chairs process
3:30	3:45	• **Public Comment**
3:45	4:00	**Wrap-up**

Scientific & Technical Subcommittee

BREAK

Subgroup Presentations and Discussion

- What was your process?
- What is your status and timeline?
- Are there science highlights to report at this time?

Tentative Sequence

1. Climate
2. Forestry
3. Biodiversity
4. Human Dimensions
5. Agriculture and Food Systems
6. Marine

Climate Subgroup

Climate (S. Birkel, A. Contosta, B. Lyon)

- Temperature/Precipitation
- Drought
- Winter/Snowpack

Hydrology (P. Lombard, G. Hodgkins)

Freshwater Quality (L. Bacon)

Air Quality (A. Johnson)

Process

- Initial scoping meeting w/ co-leads
- Follow-up meeting with all subgroup
  - Generated many questions
  - Decided approach would be to review 2020 report and determine new pieces specific to our expertise areas
- Met with Ivan and others for further discussion
- Developed outline in a shared document

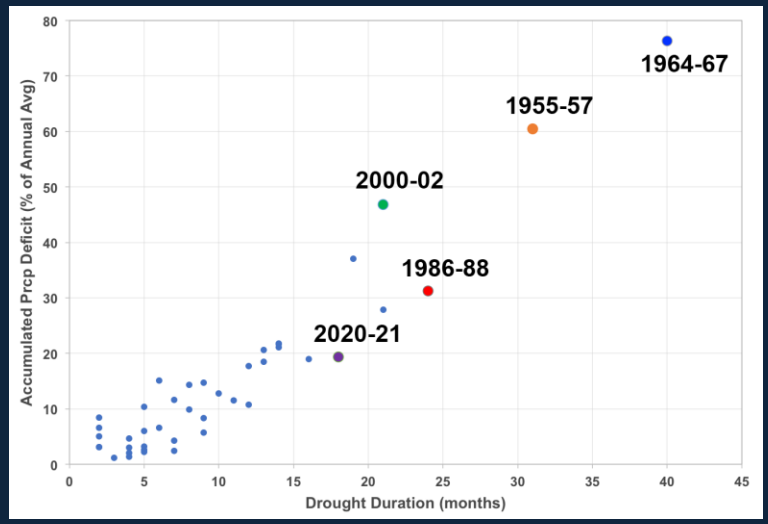
Timeline

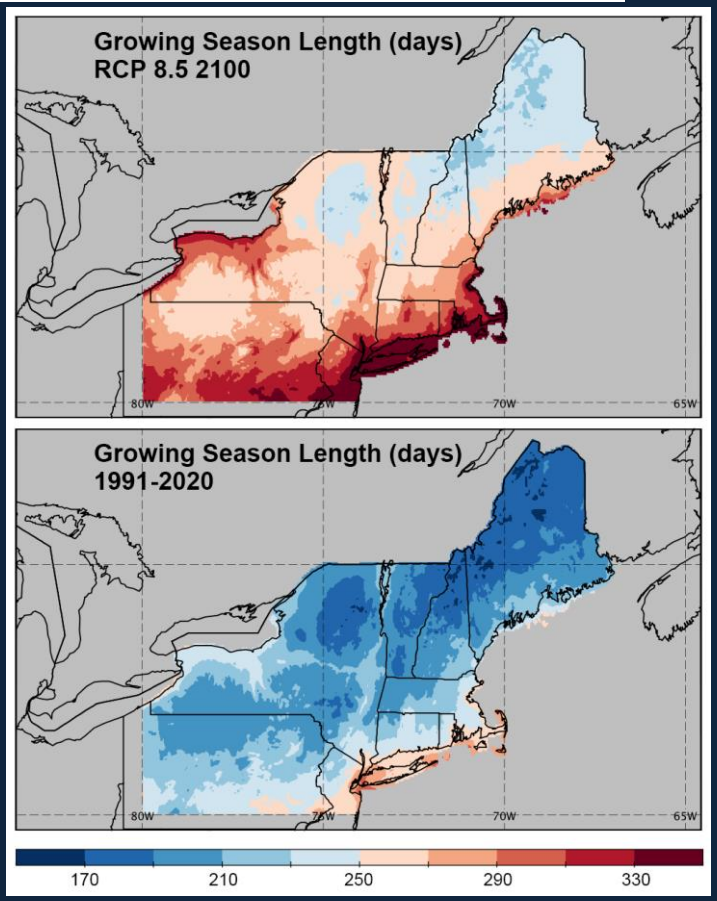
- ASAP – majority expected the week of 6 November

Science Highlights

Climate

- Updating annual T/P time series
- Updating SPI-based precip deficit vs. drought duration figure
- Updating daily heavy precipitation figure
  w/ 5-yr bins through 2022 for annual and 2023 MJJAS
- Discussing implications of First Street Foundation's 2023 precipitation Intensity Duration, and Frequency (IDF) study for non-stationary climate.
- RCP Projection maps for growing season indicators: accumulated degree days, season length, plant hardiness zones
- Discussing recent study (Wilson et al. 2020) on snowpack reduction and impacts on soil moisture in growing season
- Adding section on future winter projections based on Burakowski et al. 2022; includes impact on winter recreation
- Adding comparison of CMIP5 vs CMIP6 projections for Maine
- Discussion of 2023 climate extremes





Hydrology

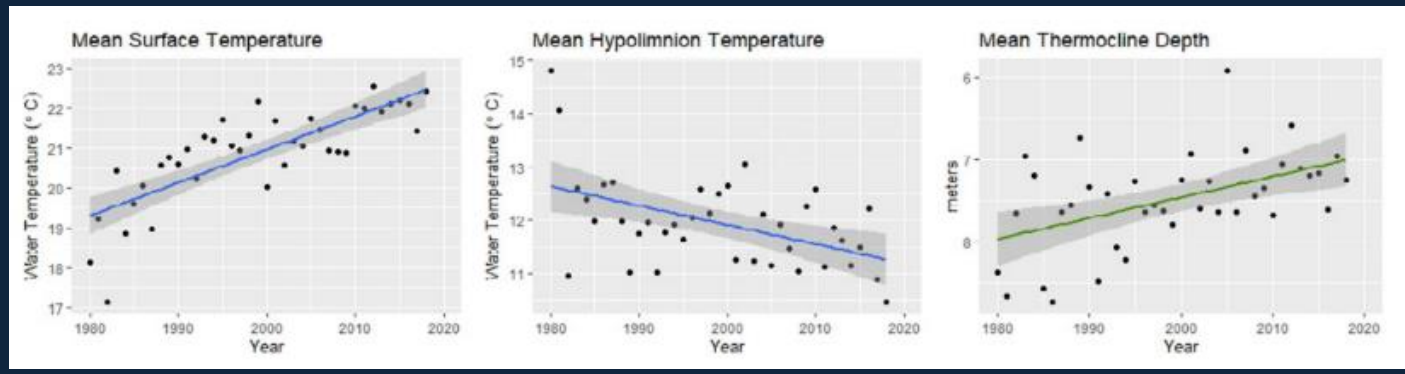
- Review of recent literature found no new studies found more relevant for Maine than those already referenced in the 2020 Hydrology chapter. However, the team is examining additional resources that may be included in the update.
- Existing priority needs unchanged at this time.

Freshwater Quality

- Review of recent literature found no substantive changes applicable to Maine freshwaters since 2020. Studies continue to support findings in the Freshwater Quality chapter in the 2020 STS report.
- Recently collected data collected by Maine DEP and others will be used to update the lake water temperature plots in 2020 report.
- Lake water color observations in 2023 suggest significantly higher Dissolved Organic Carbon (DOC) concentrations than those measured in recent years. This is likely the result of reduced DOC export from wetlands due to previous drought years

Air Quality

- Aeroallergens/Pollen: In response to the recommendations made in the 2020 report, Maine CDC and Maine DEP collaborated to advance the State's ability to measure and report aeroallergens in the ambient air.
- Funds from CDC's BRACE program used to purchase five continuous samplers with state-of-the-art technology to measure and identify aeroallergens, and two traditional manual samplers for quality assurance and linking to automated sampling data.
- CDC and DEP project planning staff convened a Pollen Advisory Group, comprised of a variety of diverse stakeholders having an interest in this topic. The group has met regularly throughout the past 12 months, to review and provide feedback on the design of the monitoring network and its initial site locations.



Forests: Process, Status & Timeline

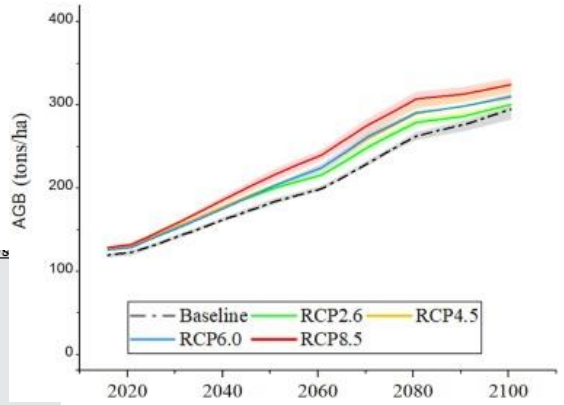
- Draft outline based on 2020 Assessment and 2021 STS Update topics
- Assign leads to each topic
- Bi-weekly Zoom meetings to review updates and discuss gaps
- Dozens of new studies identified
- 12+ pages and counting
- Next steps:
  - Refine priority information needs
  - Add highlights/key points
  - Add context to each subchapter heading
  - Work with Jess to draft and refine outline in Nov

2023 MCC STS Forests Chapter Outline

Contributors: Adam Daigneault, Alyssa Soucy, Aaron Weiskittel, Andrew Barton, Daniel Hayes, Todd Ontl, Ivan Fernandez

1. Highlights/Key Points
   a. Bullets from specific sections
2. Discussion
   a. Carbon Budget
   b. Maine forest characteristics
3. Anticipating Maine's Future Forests
   a. Projected changes in species composition, productivity, habitat conditions
      i. Zhao et al (2023) investigated alternative futures of ME's forests under a range of climate and socioeconomic conditions
      ii. Zhao et al (2022) modeled alternative socioeconomic futures on ME's forest carbon stocks and found large variance driven by assumptions about land use change, economic growth, and wood product demand
      iii. Tourville et al (2023) researched the impact of climate climate-related treeline changes in mountains of the northeastern US and found that regional treelines have significantly shifted upslope over the past several decades (on average by 3 m/decade) and that gradual diffuse treelines (characterized by declining tree density) showed significantly greater upslope shifts (5 m/decade) compared to other treeline forms. This suggests that both climate warming and treeline demography are important correlates of treeline shifts in the region.

Science Highlights – Climate Impacts



ELSEVIER
Ecological Economics
Volume 214, December 2023, 107979

Climate and socioeconomic impacts on Maine's forests under alternative future pathways

Jianheng Zhao [a b], Adam Daigneault [a b], Aaron Weiskittel [a b], Xinyuan Wei [a b]

2 February 2022

Future of Winter in Northeastern North America: Climate Indicators Portray Warming and Snow Loss That Will Impact Ecosystems and Communities

Elizabeth A. Burakowski, Alexandra R. Contosta, Danielle Grogan, Sarah J. Nelson, Sarah Garlick, Nora Casson

Author Affiliations +

Northeastern Naturalist, 28(sp11):180-207 (2022). https://doi.org/10.1656/045.028.s1112

JOURNAL ARTICLE

A Comprehensive and Spatially Explicit Regional Vulnerability Assessment of the Forest Industry to Climate Change FREE

Alyssa Soucy, Parinaz Rahimzadeh-Bajgiran, Sandra De Urioste-Stone, Aaron Weiskittel, Matthew J Duveneck, Bridie McGreavy

Journal of Forestry, Volume 120, Issue 2, March 2022, Pages 170–185, https://doi.org/10.1093/jofore/fvab057

Published: 22 November 2021 **Article history**

Home > Landscape Ecology > Article

The effects of climate change on the timing of peak fall foliage in Acadia National Park

Research Article | Open access | Published: 23 June 2023 | **38**, 2339–2355 (2023)

ECOSPHERE
AN ESA OPEN ACCESS JOURNAL

ARTICLE | Open Access

Integrating historical observations alters projections of eastern North American spruce–fir habitat under climate change

Caitlin Andrews, Jane R. Foster, Aaron Weiskittel, Anthony W. D'Amato, Erin Simons-Legaard

First published: 08 April 2022 | https://doi.org/10.1002/ecs2.4016 | Citations: 2

Journal of Biogeography

RESEARCH ARTICLE

Forests on the move: Tracking climate-related treeline changes in mountains of the northeastern United States

Jordon Tourville, David Publicover, Martin Dovciak

First published: 28 August 2023 | https://doi.org/10.1111/jbi.14708

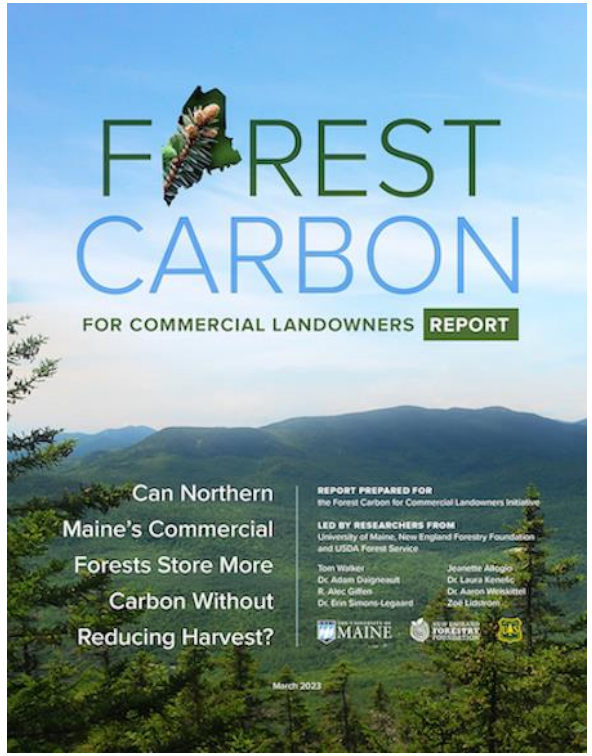
Science Highlights – Forest C Mitigation & Adaptation

Forest Ecology and Management
Volume 544, 15 September 2023, 121145

Adaptation and mitigation capacity of wildland forests in the northeastern United States

Edward K. Faison [a], Danelle Laflower [b], Luca L. Morreale [b c], David R. Foster [b], Brian Hall [b], Emily Johnson [b], Jonathan R. Thompson [b]

ME Carbon Budget (v2.0) - Forests and wood products are estimated to be acting as a net sink of 11.6 MMTCO2e, "offsetting" about 74% of total gross emissions in Maine.



Biomass and Bioenergy
Volume 161, June 2022, 106457

Technological advancement expands carbon storage in harvested wood products in Maine, USA

Ling Li [a], Xinyuan Wei [b], Jianheng Zhao [a], Daniel Hayes [a], Adam Daigneault [a], Aaron Weiskittel [a c], Anil Raj Kizha [a], Shane R. O'Neill [a]

JOURNAL ARTICLE

Climate Adaptive Management in the Northeastern United States: Common Strategies and Motivations of Rural and Urban Foresters

Tessa C McGann, Rachel E Schattman, Anthony W D'Amato, Todd A Ontl

Journal of Forestry, Volume 121, Issue 2, March 2023, Pages 182–192, https://doi.org/10.1093/jofore/fvac039
Published: 10 December 2022 **Article history**

Research Article

Public Opposition to Harvesting as a Barrier to Climate Change Adaptation: Perceptions and Responses of Foresters across the Northeastern United States

Tessa C. McGann, Rachel E. Schattman, Anthony W. D'Amato & Todd A. Ontl

Received 13 Jun 2022, Accepted 30 May 2023, Published online: 17 Jul 2023

The Human Dimensions of Climate Change in Maine

Jonathan Rubin – University of Maine, Professor of Economics, Director of the MCS Policy Center. Expertise: environmental economics, transportation, energy, climate policy.

Rebecca Lincoln – Maine Center for Disease Control and Prevention. Expertise: Environmental epidemiology, exposure assessment, heat and health.

Darren Ranco– University of Maine, Professor of Anthropology, Chair Native Programs. Expertise: indigenous communities, climate adaptation.

Cindy Isenhour – University of Maine, Anthropology and Climate Change. Expertise: mitigation/adaptation potential of circular economy and waste reduction policy. Climate justice.

Susan Elias - Staff Scientist Maine Medical Center Research Institute. Expertise: vector-borne disease, one health, modeling disease risk.

Allison Gardner– University of Maine, School of Biology and Ecology. Expertise: vector-born disease, epidemiology.

Eileen Sylvan Johnson – Bowdoin, Environmental Studies. Expertise: community resilience, collaborative resource management, decision support tools.

Gail Carson – Colby College, Environmental Studies and Director of the Buck Lab for Climate and Environment. Expertise: environmental health, food security, safer chemicals

HUMAN DIMENSIONS SUBGROUP COMPOSITION

SCIENTIFIC ASSESEMENT OF CC AND ITS EFFECTS IN MAINE

CHALLENGE: no previous "HDCC section" to revise, integrated inconsistently. ?Better to contribute more consistent HDCC content in each section or contribute new section?

PROCESS: currently operating on agreement that, in the long run, the report might include more than a focus on impacts (health, food systems) but also a focus on the science of human response and engagement (e.g. mitigation, adaptation, resilience)

OUTLINE: current outline is comprehensive (all aspects of the HDCC) including human drivers, impacts, mitigation and adaptation. Will decide at next meeting if we should:

- Suggest revisions/updates to existing sections
- Suggest revised/expanded "Maine's Economy" section
- Submit new text focused on the science around effective mitigation and adaptation

TIMELINE: populated full outline Nov 7, decision about approach Nov 8

Photo: Charles Knupp, AP 2023

Sea Level Rise and Storm Surge Highlights

- Since the last assessment, averaged sea level rise in **Maine continues to slightly exceed global long-term (1900-present) but statistically matches short-term (1993-present) changes.** The short-term rate of SLR is about 75% faster than the long-term rate. Mean sea levels have been setting records in 2023 with **June, July, August and September all setting highest monthly mean sea level records.**

- The 18.6 year lunar nodal cycle has been reducing tide range over about the last decade. **Maine is still seeing an exceedance of long-term average nuisance flooding**, driven by higher mean sea levels. The cycle will reach a minimum in 2024, **and increasing tide range will combine with sea level rise to cause an acceleration in flood frequency which will peak in the mid-2030's.**

- Newer sea level rise curves (Sweet et al., 2022) constrain sea level scenarios out to 2050 based on improved understanding of the timing of ice sheet processes. These diverge and become less certain after 2050 due to unknown probability ice sheet instabilities. **Better understanding of ice sheet instabilities and potential impacts on regional sea level change will be key for further constraining scenarios in the future**.

- Maine's "commit to manage" scenario (1.5 feet by 2050 and 4 feet by 2100), based on the central estimate of the intermediate curve (Sweet et al., 2017), **continues to fall within the likely range of the newer intermediate scenario**. **We recommend maintaining this "commit to manage" scenario.**

- Maine's "prepare to manage" scenario (3 and 8.8 feet for 2050 and 2100, respectively) now **falls outside** of the likely range of the newer high scenario (1.0 to 2.0 feet for 2050 and 4.3 to 7.5 feet for 2100) . However, **under the new high scenario, these numbers are simply shifted a few decades later (e.g., 2070 and 2120). Preparing for sea level rise beyond 2100 will be critical for Maine.**

Next Steps

- **Nov 15 “deadline” for**
  - ✓ **Section outline populated with studies to be included** *(It will be most helpful to have folders with PDFs or links to the resources. Jess will use bibliographic software to standardize our reference format (and potentially provide a bibliographic resource.)]*
  - ✓ **TOP 3-5 priorities/highlights most relevant to WGs, the “darts” from STS.**
- **Reiterate focus: What is new and relevant for WGs?**
- **Process continues after Nov 15: focus on draft writing and iterative interactions with Leads and subgroups**
- **Everyone will have the link to subgoups outlines**

DISCUSSION


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

PUBLIC COMMENT


A FOUR-YEAR PLAN FOR CLIMATE ACTION
MAINE
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WRAP-UP

Next Scientific and Technical Subcommittee Meeting

December 7, 2023
1-4 PM
(Zoom – details to follow)