A regional synthesis of climate data to inform the 2025 State Wildlife Action Plans in the Northeast U.S.

Kevin R. Burgio (USGS/UMass Amherst)
PIs: Michelle Staudinger (USGS), Karen Terwilliger (TCI), Ambarish Karmalkar (UMass Amherst), Toni Lyn Morelli (USGS), & Anthony D’Amato (UVM)
Hi stars hot summers... will become the coolest

Winter

Historical

Projections

Higher Emissions

Lower Emissions

The coldest winters in future will be like the warmest of recent years

Summer

hottest summers...

...will become the coolest

USGS

Karmalkar 2016
Summer in New Hampshire by the end of this century could feel like a present-day typical summer in North Carolina.
NE CASC Climate Synthesis Goals

• Summarize climate-related threats to NEAFWA-regional RSGCN and their habitats

• Develop illustrative case studies of successful climate adaptation efforts and climate threat-to-action narratives of how climate data has been integrated into decision-making

• Synthesize lists of climate-related tools, frameworks, and other resources to help SWAP writing teams and other stakeholders connect with existing regional initiatives
2015 Report Highlights

- Trends and projections for **60+ climate variables**
- Literature review of **367 Regional Species of Greatest Conservation Need (RSGCN)**
- Synthesis of **25 CCVAs** covering ~1000 species and ~80 habitats
- Searchable database of **~960 adaptation strategies** by scale, target resource, climate stressor, national goals
- **Case studies** and **tools** showcasing regional adaptation and resilience initiatives
2025 Synthesis Outline

1. Climate change information
2. Species responses to climate change
3. Climate vulnerabilities and risks
4. Scale-appropriate adaptation strategies and actions
5. Case studies
6. Recent climate adaptation resources
1. Climate Change Information

- Projections for all NEAFWA states using MACAv2 dataset using 16 climate models (CMIP5)
- Current and future maps and plots at multiple scales (EPA Level 3, watershed HUC 8)
- Qualitative and quantitative interpretive written summaries
- List of best/consistent predictors
- Uncertainty and risk framing

Number of days with Precip > 1 in based on observations
2. Species Responses to Climate Change

- Literature review for NE
- Quantitative analysis of RSGCN range and distribution shifts
- Identify data gaps/deficient species
Biological Responses

• Move
  • spatial shifts (e.g. latitude, elevation, depth)

• Adapt
  • phenology shifts
  • morphological / physiological changes
  • diet shifts
  • behavioral shifts

• Go extinct
  • population declines
  • local extirpations
7118 Articles

- Delete: 61%
- Related Species: 7%
- More Review Needed: 18%
- Non-Climate Change / Northeast: 7%
- Full Review: 7%
<table>
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<tr>
<th>Species</th>
<th>Category</th>
<th>Km per Decade Shift</th>
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Mothes et al. 2020

Range Shift

Increase protected areas, especially in higher elevations
3. Climate Vulnerabilities and Risks

- Updated list and database of CCVAs since 2015
- Written summary of advances and pros/cons of different assessments

Refugia cores & connections for wood turtle
NH Climate Change Vulnerability Assessments

- 23 NH species assessed since 2015
- *Not* assessed in CCVA since 2015
  - Rock Vole, Northern Bog Lemming, Monarch
- 45 Individual *rankings* of NH species (from the list) since 2015
4. Adaptation Strategies & Actions

- Summary and database of strategies and actions
- Actions for NE RSGCN organized around top climate threats
- Identify actions with multiple climate/non-climate benefits
5. Case Studies

- Extreme events result-chains that link system responses to multiple threats specific to RSGCN
  - Extreme precipitation (drought, floods)
  - Coastal impacts
6. Climate Adaptation Resources

- Database of recent climate tools and frameworks specific to RSGCN and their habitats
  - RAD
  - Updated NFWPAS
  - Scenario Planning
  - SDM
  - Spatial planning tools

- Partner projects summaries
Products and Timelines of Dissemination

- Work plan and 2-pager: Available now!
- USGS Cooperator Report and appendixes: Mid 2023 - Early 2024
- Special issue in regional journal: 2024
- NE CASC webinar: late 2023
- Special session at NEAFWA: 2024
- Presentation to SWAP Coordinators: Late 2023 - early 2024
- Presentation to NEFWDTC and NEHTC: Late 2023 - early 2024
Impact of snow loss on NH carnivores

Camera trapping throughout northern New England

Sirén et al. 2020
High Uncertainty Species
Northern Bog Lemming
Thanks!

Contacts:

Michelle Staudinger: mstaudinger@usgs.gov
Toni Lyn Morelli: tmorelli@usgs.gov
Kevin Burgio: kevin.burgio@gmail.com

More info at: https://necasc.umass.edu/projects/integrating-climate-change-state-wildlife-action-plans