NECASC
Northeast Climate Adaptation Science Center

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

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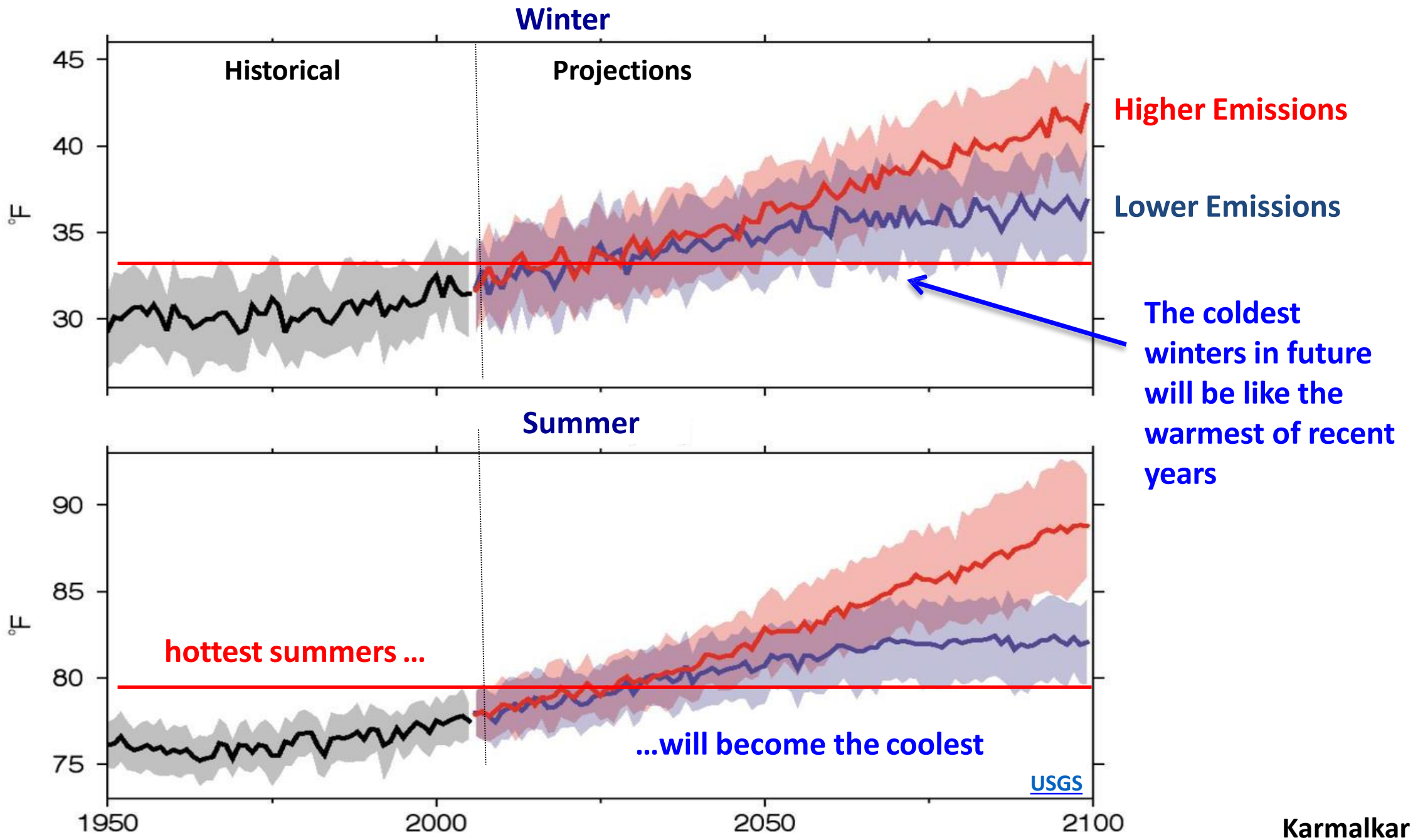
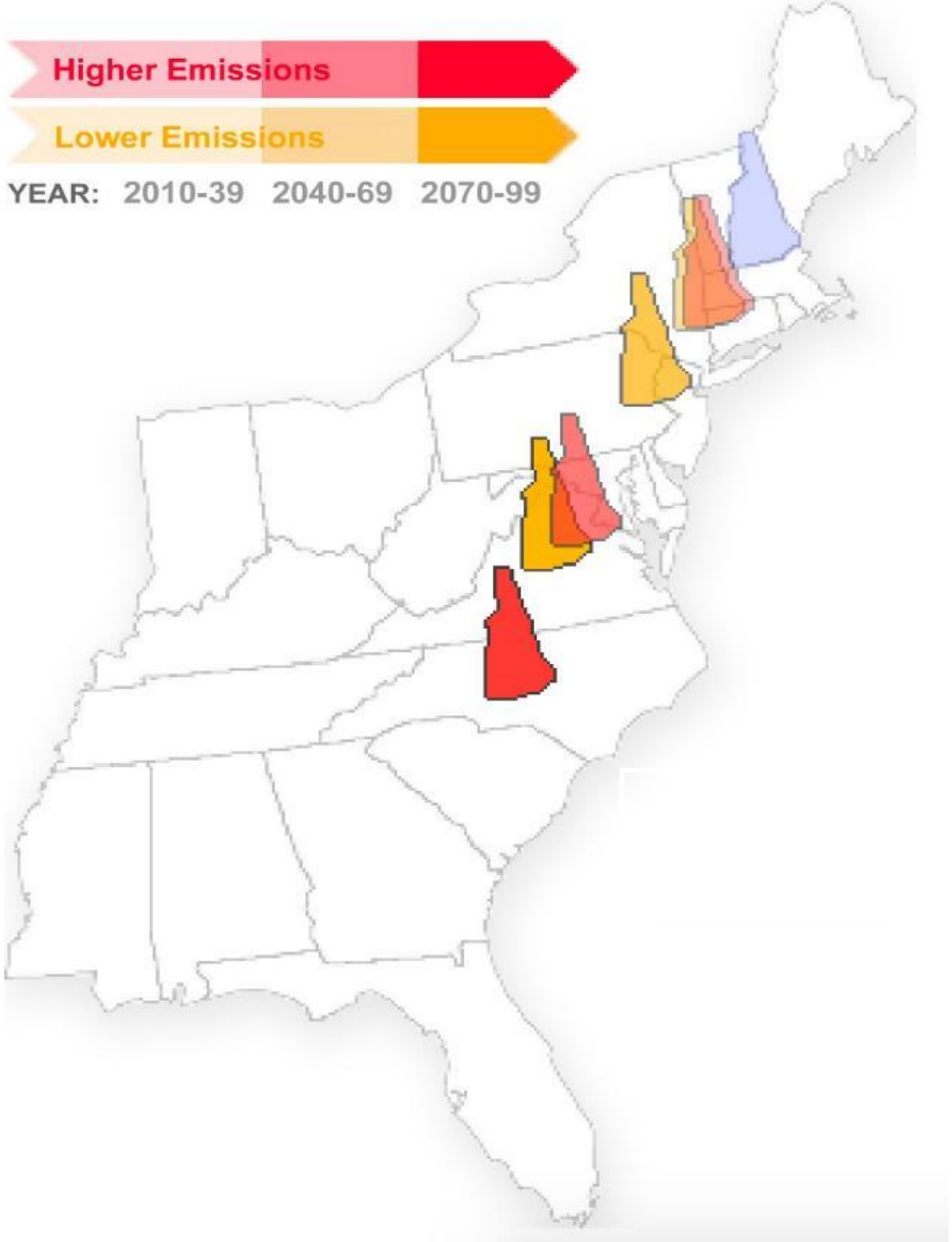
UMASS AMHERST
TCI Nature Conservation and Communication
The University of Vermont



Karmalkar 2016



Summer in New Hampshire by the end of this century could feel like a present-day typical summer in North Carolina

UCSUSA

NE CASC Climate Synthesis Goals

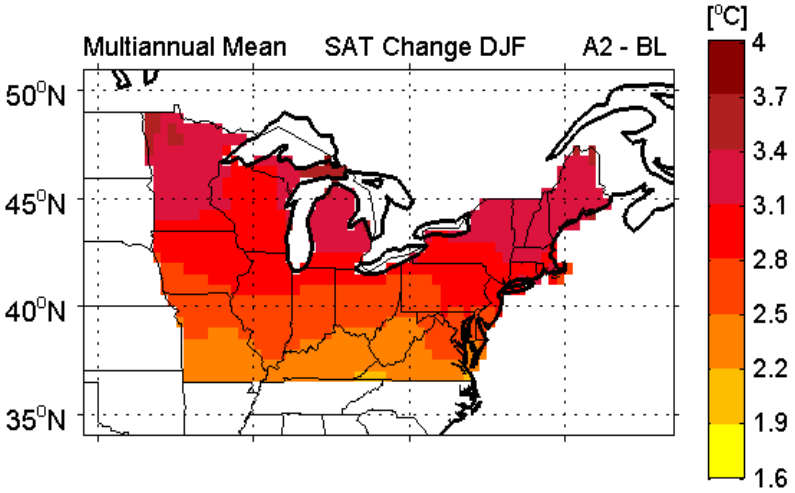
- **Summarize climate-related threats to NEAFWA-regional RSGCN and their habitats**

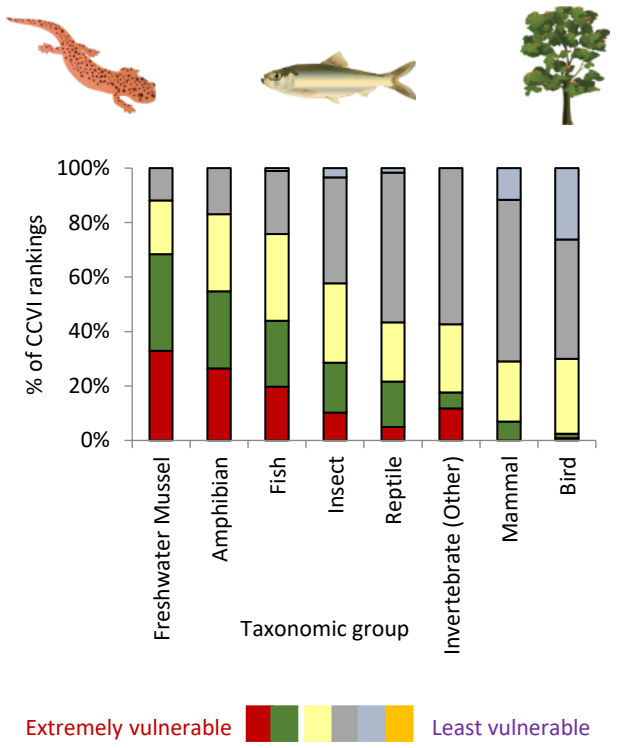
- **Develop illustrative case studies of successful climate adaptation efforts and climate threat-to-action narratives of how climate data has been integrated into decision-making**

- **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

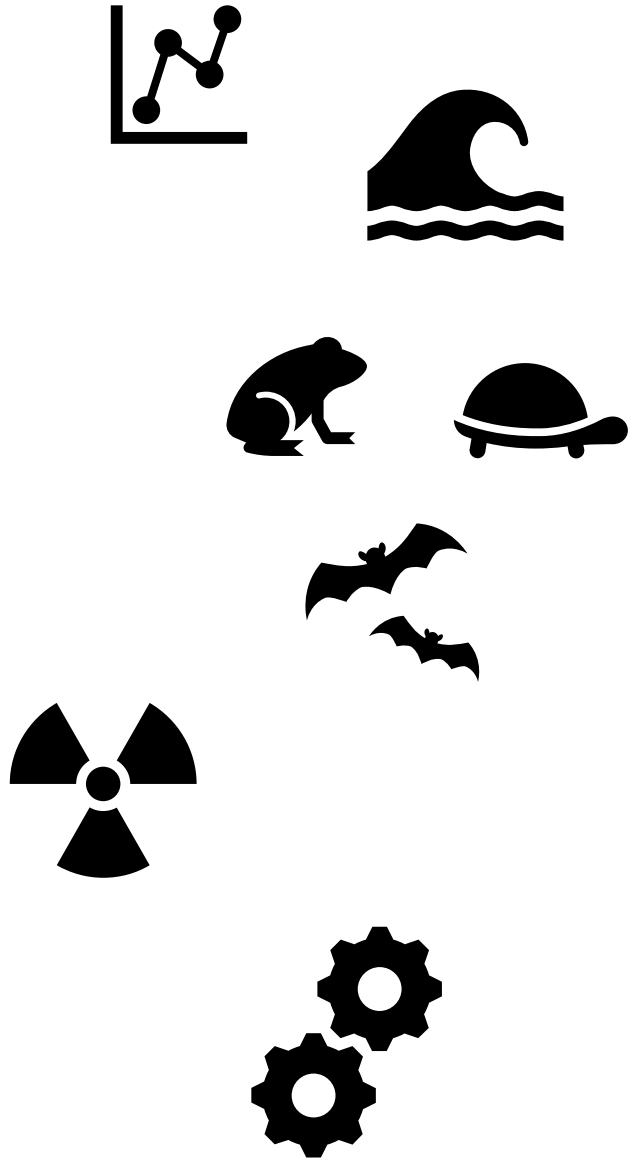
- Trends and projections for **60+ climate variables**
- Literature review of **367 Regional Species of Greatest Conservation Need** (RSGCN)
- Synthesis of **25 CCVAs** covering ~1000 species and ~80 habitats
- Searchable database of **~960 adaptation strategies** by scale, target resource, climate stressor,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





2025 Synthesis Outline

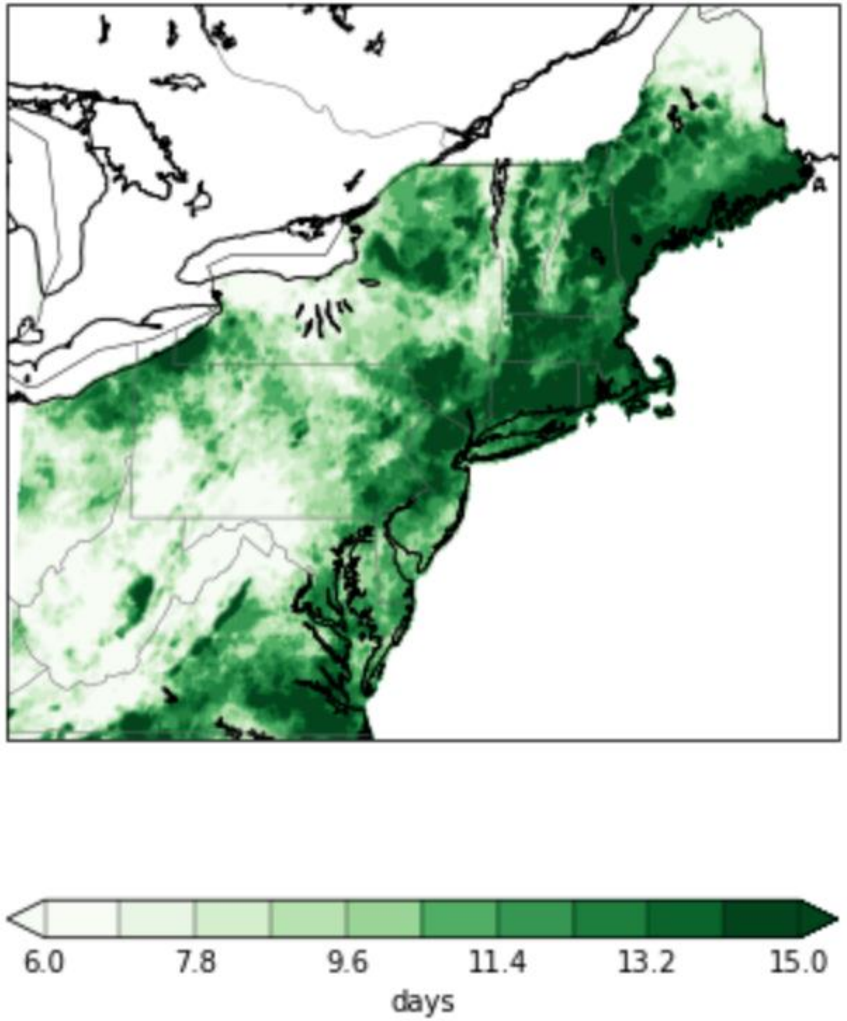
1. Climate change information
2. Species responses to climate change
3. Climate vulnerabilities and risks
4. Scale-appropriate adaptation strategies and actions
5. Case studies
6. Recent climate adaptation resources



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

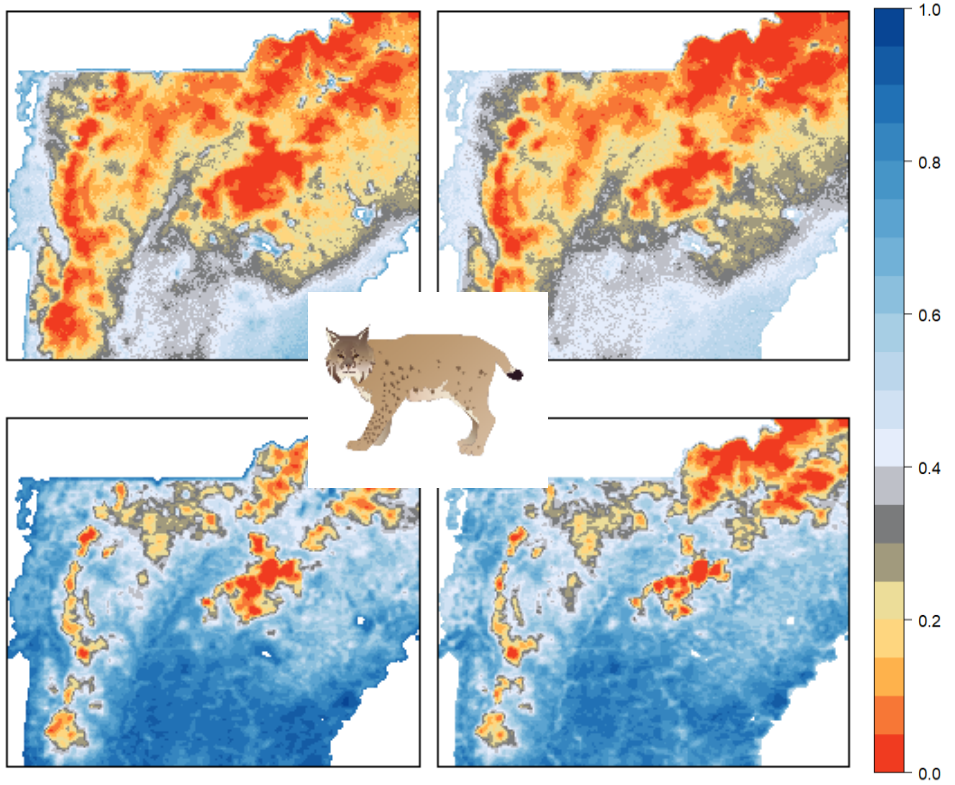
Number of days with Precip > 1 in based on observations



2. Species Responses to Climate Change

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

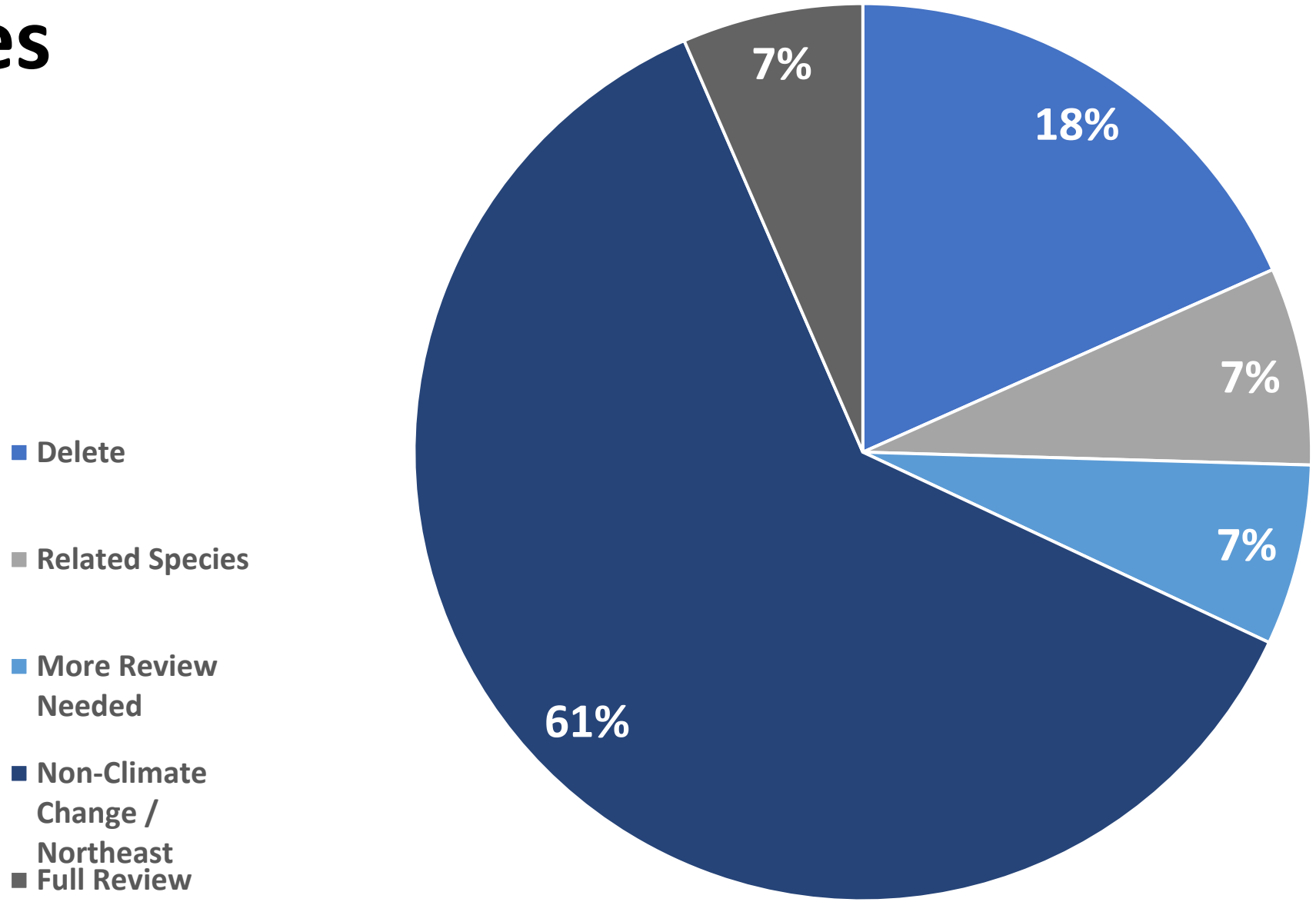
Projections of future bobcat habitat

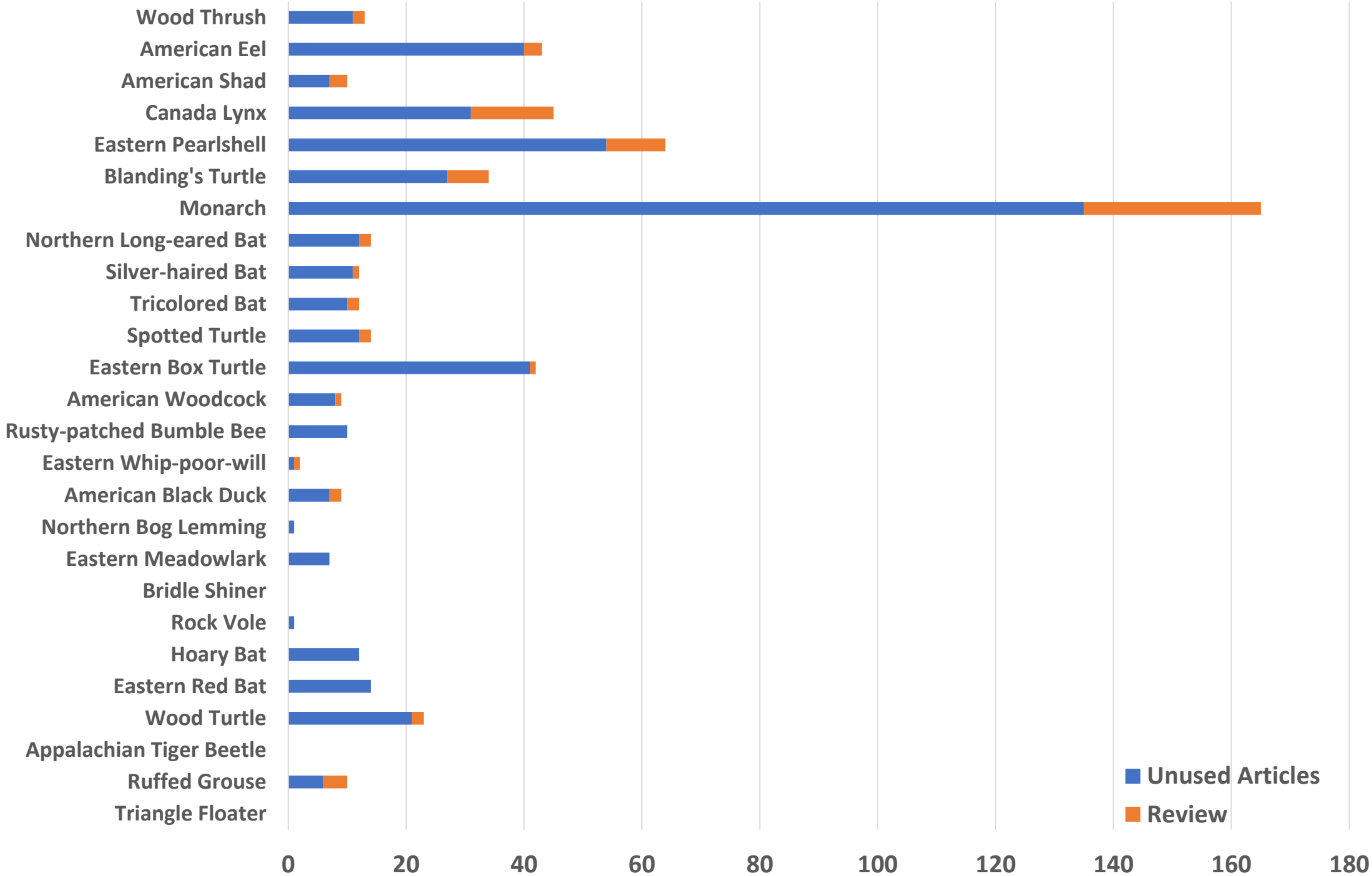


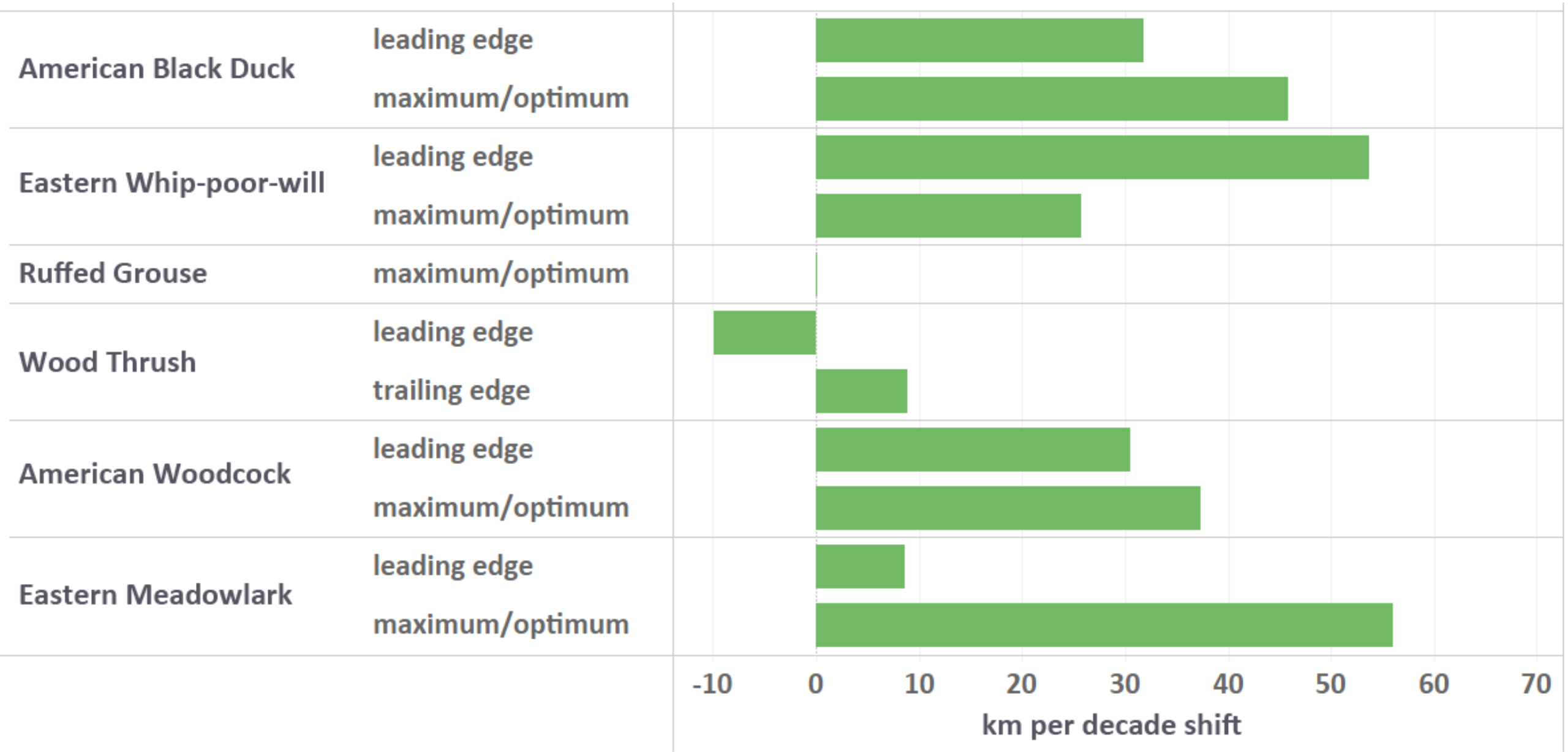
Biological Responses

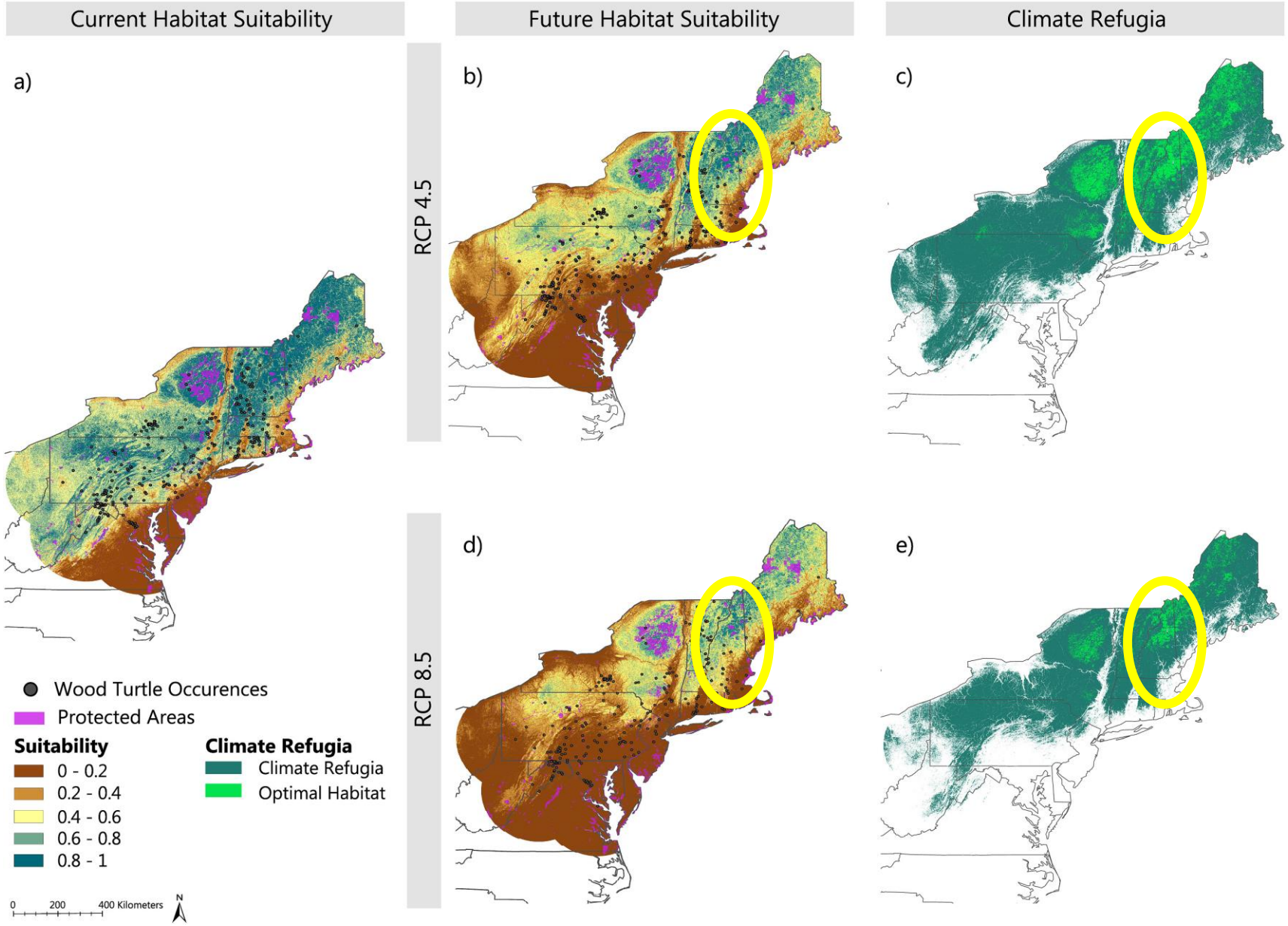
- Move
  - spatial shifts (e.g. latitude, elevation, depth)
- Adapt
  - phenology shifts
  - morphological / physiological changes
  - diet shifts
  - behavioral shifts
- Go extinct
  - population declines
  - local extirpations

7118 Articles




Wood Thrush
American Eel
American Shad
Canada Lynx
Eastern Pearlshell
Blanding's Turtle
Monarch
Northern Long-eared Bat
Silver-haired Bat
Tricolored Bat
Spotted Turtle
Eastern Box Turtle
American Woodcock
Rusty-patched Bumble Bee
Eastern Whip-poor-will
American Black Duck
Northern Bog Lemming
Eastern Meadowlark
Bridle Shiner
Rock Vole
Hoary Bat
Eastern Red Bat
Wood Turtle
Appalachian Tiger Beetle
Ruffed Grouse
Triangle Floater
Unused Articles
Review
0
20
40
60
80
100
120
140
160
180

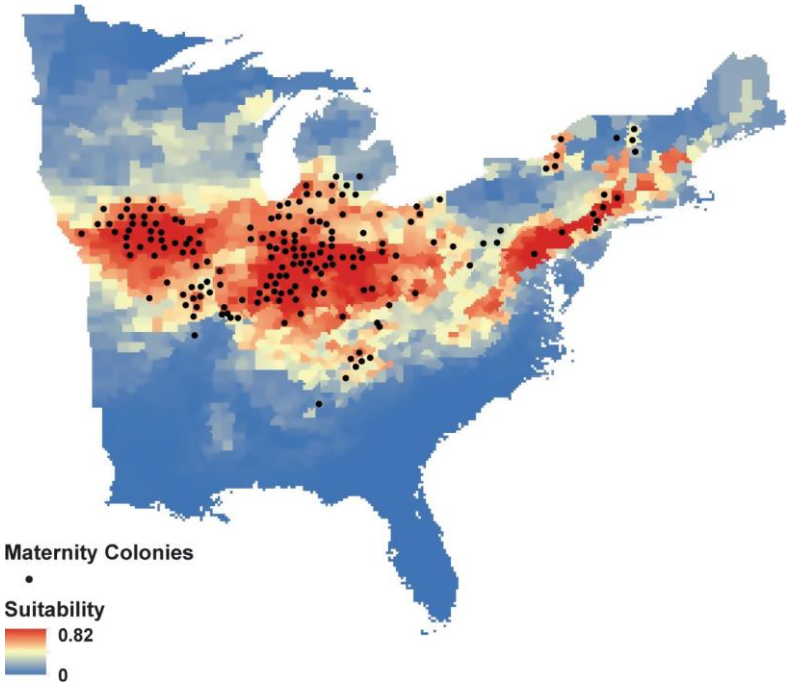

American Black Duck
leading edge
maximum/optimum
Eastern Whip-poor-will
leading edge
maximum/optimum
Ruffed Grouse
maximum/optimum
Wood Thrush
leading edge
trailing edge
American Woodcock
leading edge
maximum/optimum
Eastern Meadowlark
leading edge
maximum/optimum
-10
0
10
20
30
40
50
60
70
km per decade shift

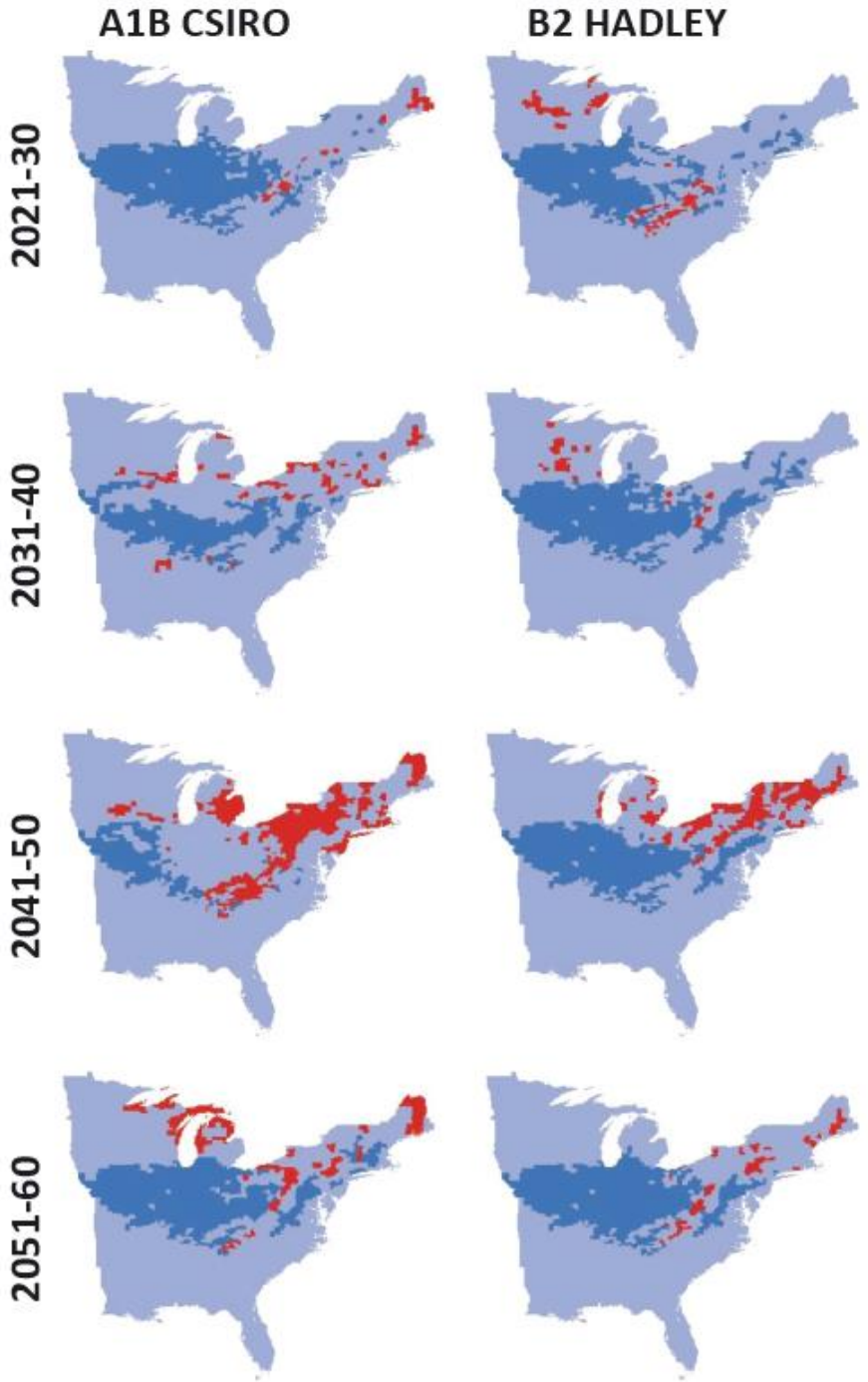


Range Shift

Increase protected areas, especially in higher elevations

Mothes et al. 2020





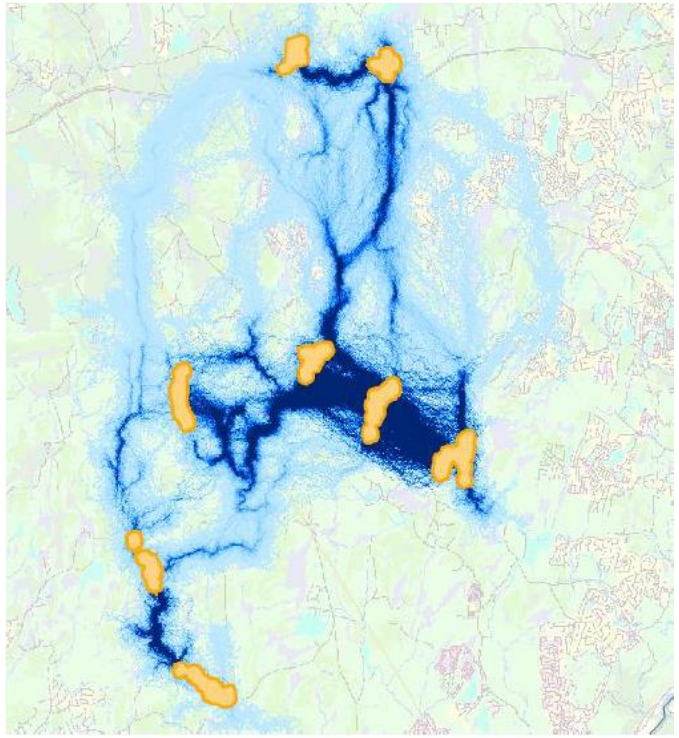
Range Shift

Loeb et al. 2013

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

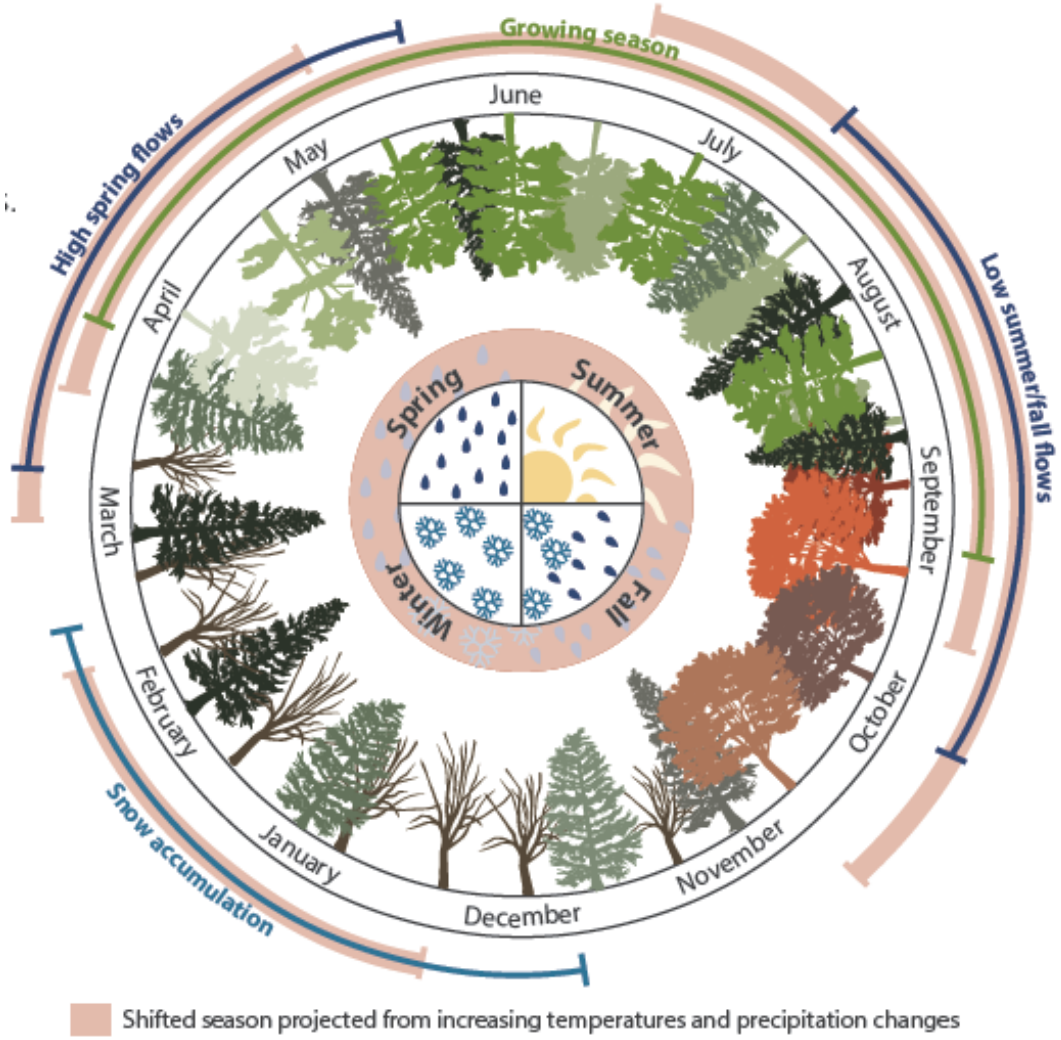
4. Adaptation Strategies & Actions

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

Habitat to be restored and maintained	Habitat quality for focal species	Stand-level carbon storage in trees	Habitat and wildlife species diversity	Risk of carbon release from severe disturbance	Enhanced resilience and adaptive capacity
Early successional n. hardwoods	↗	↘	↗	↘	↗
Tallgrass aspen parklands	↗	↘ *	↗	↘	↗
Oak savanna	↗	↘ *	↗	↘	↗
Pitch pine-scrub oak barrens	↗	↘	↗	↘	↗
		Stand-level effects		Landscape-level effects	

5. Case Studies

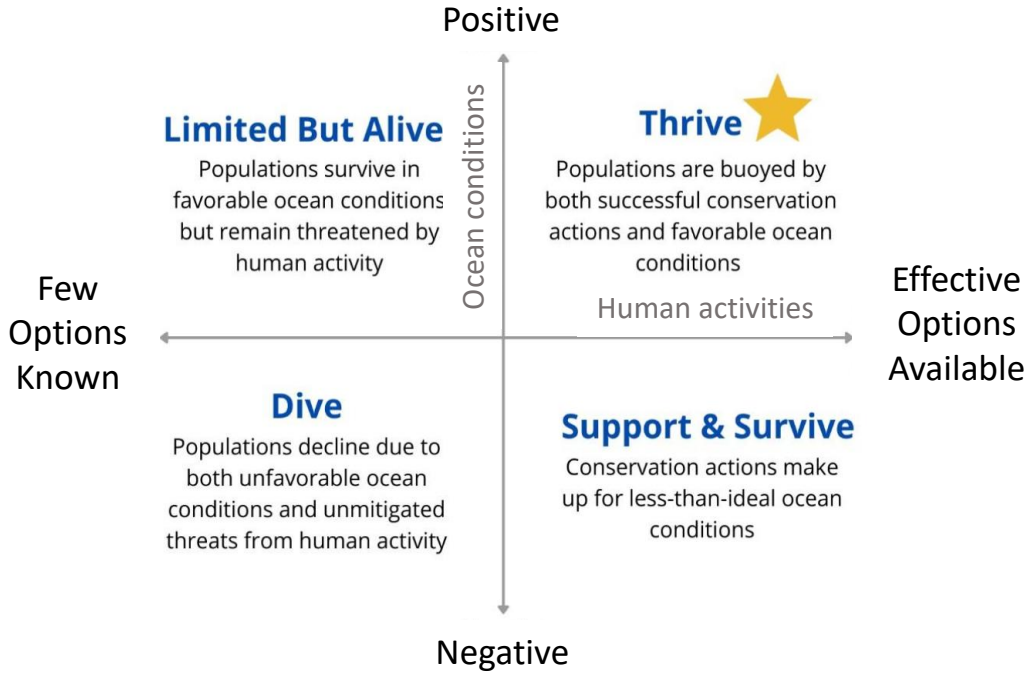
- Extreme events result-chains that link system responses to multiple threats specific to RSGCN
  - Extreme precipitation (drought, floods)
  - Coastal impacts



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

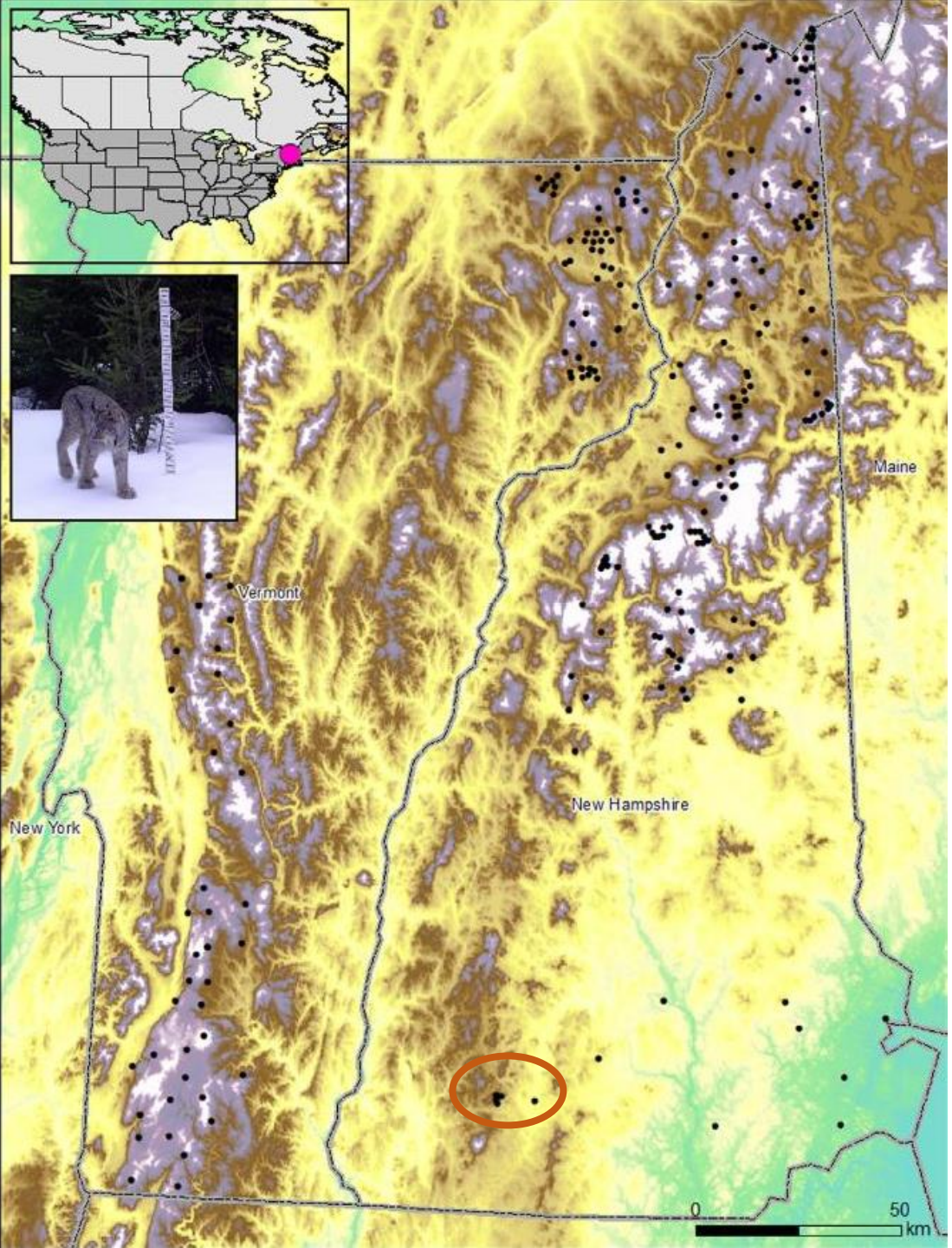


Products and Timelines of Dissemination

• Work plan and 2-pager	Available now!
• USGS Cooperator Report and appendixes	Mid 2023 - Early 2024
• Special issue in regional journal	2024

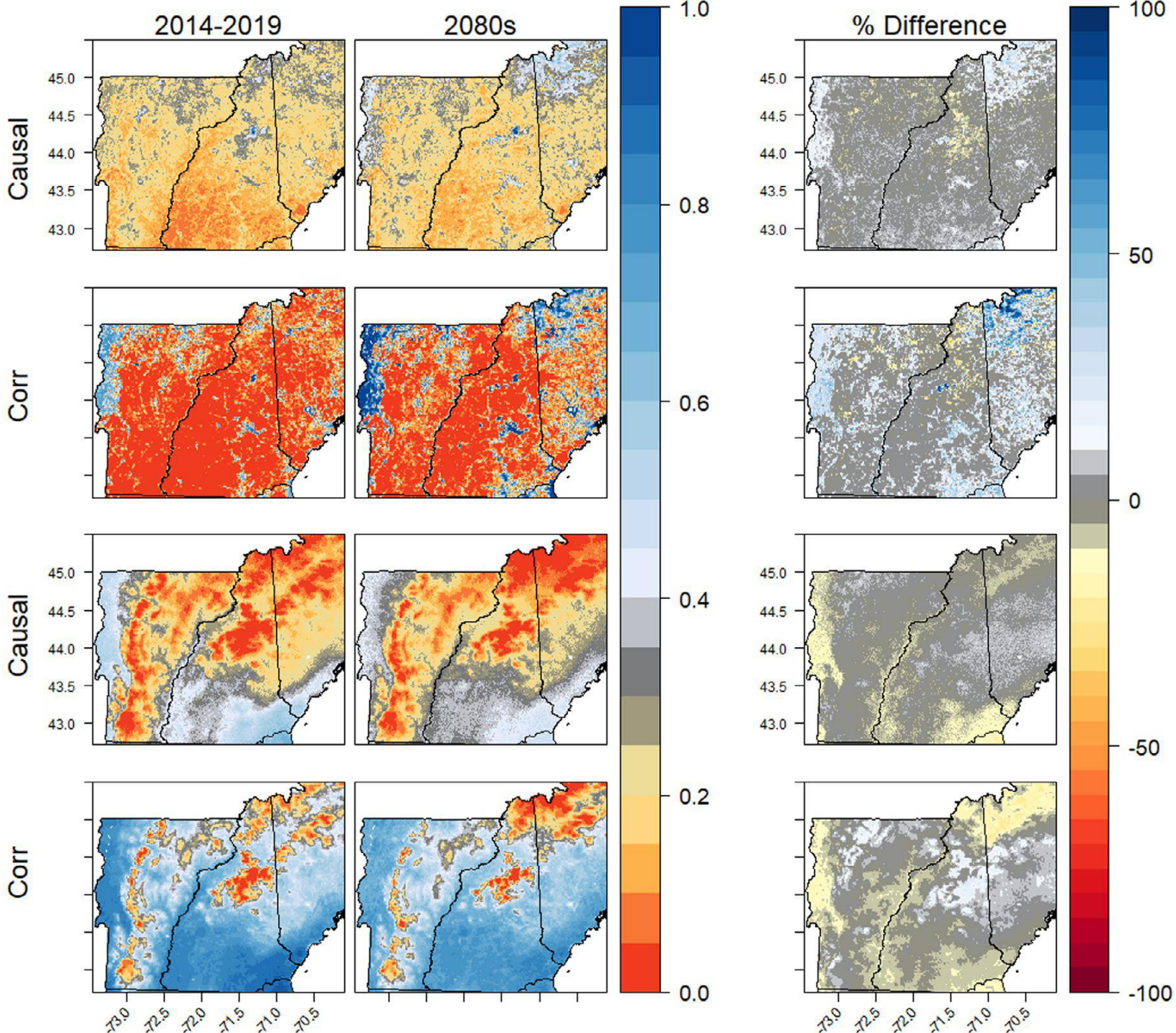
• NE CASC webinar	late 2023
• Special session at NEAFWA	2024
• Presentation to SWAP Coordinators	Late 2023 - early 2024
• Presentation to NEFWDTC and NEHTC	Late 2023 - early 2024

Impact of snow loss on NH carnivores



Camera trapping throughout northern New England

Sirén et al. 2020



Sirén et al. 2020

High Uncertainty Species

Northern Bog Lemming

Thanks!

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