

## BACKGROUND

1. Climate change is already impacting ecological systems and species across North America
2. Assessing the vulnerabilities of ecological resources is essential step toward adaptation
3. Many states in Northeast already performing vulnerability assessments (habitats and/or species)
4. Results of state assessments need to be put in regional context for effective conservation planning and action
5. Also, many state and NGO agencies need to build capacity to address climate change and adaptation
6. Project funded by NEAFA and U.S. Fish and Wildlife.

## PROJECT OBJECTIVES

1. Quantify the vulnerabilities of fish and wildlife habitats in the region and how these vary geographically
2. Project how habitats and species will change their status and distributions under climate change.
3. Identify potential adaptation options to safeguard vulnerable habitats and species.
4. Identify monitoring strategies to track the impacts of climate change and the effectiveness of adaptation actions.
5. Help states to increase their institutional knowledge and capabilities to respond to climate change.

## UNCERTAINTY EVALUATION

- All of 16 variables assigned a certainty score (High, Medium, Low)
- Allows areas of most uncertainty to be identified
- Certainty scores combined in Module 3 into overall certainty evaluation

## TASKS

1. Build habitat model to project vulnerabilities
2. Apply model to selected habitats across region
3. Map geographical variation in vulnerabilities and identify potential refugia
4. Apply existing species model to evaluate vulnerabilities of keystone/foundational spp.
5. Compile catalogue of adaptation options
6. Develop monitoring tools

# VULNERABILITIES TO CLIMATE CHANGE OF NORTHEASTERN FISH AND WILDLIFE HABITATS

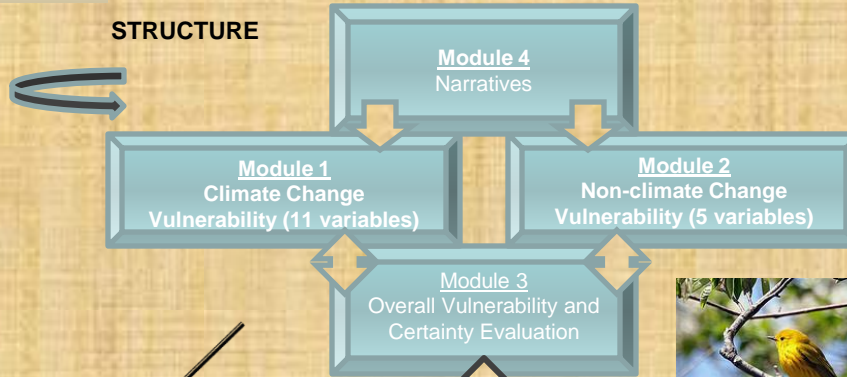
*Hector Galbraith, Manomet Center for Conservation Sciences*

*Curtis Fisher, George Gay, and Chris Hilke, National Wildlife Federation*

## NEAFA HABITAT VULNERABILITY MODEL

A predictive model of habitat vulnerability has been built  
This model will be consistently applied to selected habitats across the Northeast  
Results will provide basis for mapping geographical variation in vulnerability

## STRUCTURE



Module 1 – assesses vulnerability to climate change factors  
Module 2 - assesses vulnerability to other (non-climate) stressors and interactions with climate change factors  
Module 3 - combines 1 and 2 into overall vulnerability  
Module 4 – Makes explicit assumptions and logic steps underpinning scores (transparency) and quantifies uncertainty

## HABITATS SELECTED FOR ANALYSES

### Forests and Woodlands

Laurentian-Acadian Northern Hardwood Forest  
Laurentian-Acadian Pine-Oak Forest  
Laurentian-Acadian Pine-Hemlock-Hardwood Forest  
South-Central Interior Mesophytic Forest  
Central Appalachian Pine-Oak Rocky Woodland  
Northeastern Interior Dry-Mesic Oak Forest  
Central Appalachian Dry Oak-Pine Forest  
Northeastern Interior Pine Barrens  
Laurentian-Acadian Floodplain Forest  
Montane Spruce-Fir Forest  
Appalachian (Hemlock)-Northern Hardwood Forest  
High Allegheny Wetland

### Tundra

Alpine Tundra

### Aquatic

Cold water fisheries  
Central Appalachian Stream/Riparian  
Floodplain Central Appalachian River

### Wetlands

North-central Appalachian Acidic Swamp  
North-Central Interior and Appalachian Acidic-Peatland  
Laurentian-Acadian Wet Meadow-Shrub Swamp  
Northern Atlantic Coastal Plain Fresh and Oligohaline Tidal Marsh  
Laurentian-Acadian Freshwater Marsh  
Low Elevation Boreal Bogs



## ROLE OF EXPERT PANELS

\*40 biologists, ecologists, and planners from 13 state agencies, NGOs and federal agencies make up expert panel.

\*Function is:

to help build and run habitat model to select habitats for analyses to peer review and critique results of model runs to help build expertise within agencies

## THREE HABITAT WORKGROUPS

|    | Forests                              | Wetlands                             | Aquatic        |
|----|--------------------------------------|--------------------------------------|----------------|
| ME | Andrew Cutko                         | Philip DeMaynadi er                  | Steve Walker   |
| NH |                                      |                                      | Matt Carpenter |
| VT | John Austen                          |                                      |                |
| MA | John Scanlon                         |                                      | Caleb Slater   |
| NY |                                      | Zoe Smith                            |                |
| CT | Min Huang                            |                                      | Neal Hagstrom  |
| NJ | Kris Schantz                         | Kathleen Walz                        |                |
| PA | Mary Ann Furedi<br>Greg Podniesinski | Greg Podniesinski<br>Mary Ann Furedi |                |
| VA |                                      | David Norris                         |                |
| WV | Elizabeth Byers                      | Elizabeth Byers                      | Kerry Bledsoe  |
| MD | Dana Limpert                         | Dana Limpert                         | Dana Limpert   |

## NEXT STEPS

- Apply vulnerability model to selected habitats
- Map geographical variation in habitat vulnerabilities
- Run NatureServe model on selected species
- Map likely habitat refugia
- Identify suitable indicator species for monitoring
- Begin process of identifying adaptation options