



# Forests and Climate Change: Managing impacts and planning for the future

9:00 to 5:30, December 14, 2018

Davis Center -- University of Vermont -- Burlington, VT



## Agenda

**8:15 – 9:00**      **Registration and Coffee** (*Livak Fireplace Lounge. Coffee in Sugar/Silver Maple*)

**8:30 – 8:45**      **What is the FEMC?** (*Williams Family Room*)

First time at the FEMC conference? Want to learn more about what the FEMC does and how it works? Grab some coffee and join us for a quick pre-conference intro session to kick off your day.

**9:00 – 9:20**      **Introduction and Welcome** (*Sugar/Silver Maple*)

**9:20 – 10:30**      **Plenary: Climate Change Impacts on Northeastern Forests, Water, and Wildlife** (*Sugar/Silver Maple*)

Confirmed speakers include:

**Maria Janowiak**, Deputy Director, Northern Institute of Applied Climate Science

***What's at risk? Implications of climate change in our region's forests***

The changing climate is altering the forests across the Northeast, leading natural resource professionals and woodland owners to learn how to evaluate risks for the lands that they own and manage and to prepare these systems for future conditions. This presentation will describe how climate change is expected to affect the 40 million acres of forest found in the region.

**Toni Lyn Morelli**, USGS Research Ecologist, DOI Northeast Climate Adaptation Science Center

***Climate Change Vulnerability and Adaptation of Forest Wildlife***

A synthesis of the impacts of climate change on the wildlife of northeastern forests, as well as what tools and products are available to aid in climate change adaptation.

**Keith Nislow**, Research Fisheries Biologist, USDA-Forest Service Northern Research Station

***Water and aquatic ecosystems in a changing regional climate***

This presentation will describe what we know about current and forecasted climate-driven changes in water quantity and quality, discuss how these effects translate into impacts on aquatic ecosystems, and demonstrate how existing and novel management and conservation approaches can help to reduce vulnerability to climate change along multiple resource dimensions.

**10:30 – 10:50**      **Coffee Break** (*Sugar/Silver Maple*)

## 10:50 – 12:10 Contributed Talks 1 *(Rooms listed below)*

**SPECIAL TRACK:** This track of talks continues throughout the day and connects to a working session in the afternoon.

<b>Forests and Climate</b> <i>Moderator: Maria Janowiak</i> <i>Room: Silver Maple</i>	<b>Wildlife and Climate</b> <i>Moderator: Toni Lyn Morelli</i> <i>Room: Chittenden Bank</i>	<b>Water and Climate</b> <i>Moderator: Kacey Clougher</i> <i>Room: Mildred Livak</i>	<b>Forest Health</b> <i>Moderator: Rebecca Stern</i> <i>Room: Frank Livak</i>	<b>Special Track</b> <b>Year of the Bird 1</b> <i>Moderator: John Lloyd</i> <i>Room: Jost Foundation</i>
Adaptive Silviculture for Climate Change: Examining strategies for adapting northern forests to global change <i>Peter Clark</i>	Quantifying the relative projected impacts of climate change and urban growth on the capability of the northeast to support wildlife <i>William V. DeLuca</i>	Climate change effects on water quantity and quality in the Northern Forest <i>Jamie Shanley</i>	Long-term bird monitoring in northeastern National Parks <i>Aaron Weed</i>	Forest Management on New York Wildlife Management Areas  <i>Katherine Yard</i>
Vermont Agency of Natural Resources Guidelines for Implementing Assisted Migration of Plants on Agency Lands <i>Robert Popp</i>	Distribution dynamics of mesocarnivore populations along trailing and leading edges in the northeastern U.S. <i>Alexej P. K. Siren</i>	Tracking trajectories and sensitivities in forest water use <i>Mark Green</i>	Partnering with land managers to guide the search for EAB-resistant ash <i>Jonathan Rosenthal</i>	What do Woodland Owners in the Northeast Think of Bird Conservation? <i>Elizabeth Varanas</i>
Cold hardiness of American elm crosses bred for Dutch elm disease tolerance <i>Paul Schaberg</i>	A Slow Loss of Northern Forest Icons: Dynamics of Boreal Birds at the Edge of their Range in the Adirondack Park <i>Michale Glennon</i>	Effects of extreme high flow events on macroinvertebrate communities in Vermont streams <i>Jen Stamp</i>	Beaver Foraging Preferences and Impacts on Forest Structure in New York's Adirondack Mountains <i>Michael J Mahoney</i>	A New Paradigm for Forest Bird Conservation: A holistic approach to managing for multiple species guilds <i>Steve Hagenbuch</i>
Examining the future forest through tree seedling experiments <i>Nick Fisichelli</i>	The cost of reproduction in a greening world <i>Michael T. Hallworth</i>	A simulation modeling approach to investigate hydrologic regime transformations following Eastern hemlock mortality <i>Kanishka Singh</i>	Managing invasive species in light of climate change <i>Carrie Brown-Lima</i>	Forest bird conservation at Mass Audubon: the role of sanctuaries and private lands <i>Jeff Ritterson</i>

## 12:10 – 1:20 Lunch *(Sugar/Silver Maple)*

## 1:20 – 2:40 Contributed Talks 2 *(Rooms listed below)*

**SPECIAL TRACK:** This track of talks continues throughout the day and connects to a working session in the afternoon.

<b>Forest Ecology</b> <i>Moderator: Kacey Clougher</i> <i>Room: Frank Livak</i>	<b>Forest Monitoring</b> <i>Moderator: Adam Noel</i> <i>Room: Mildred Livak</i>	<b>Planning, Implementation, and Stakeholder Engagement</b> <i>Moderator: Alex Neidermeier</i> <i>Room: Chittenden Bank</i>	<b>Wildlife Monitoring</b> <i>Moderator: Brendan Case</i> <i>Room: Williams Family</i>	<b>Special Track</b> <b>Year of the Bird 2</b> <i>Moderator: John Lloyd</i> <i>Room: Jost Foundation</i>
Importance of woody debris dynamics in understanding the forest carbon cycle <i>Shawn Fraver</i>	What have we Learned from Monitoring Maine's Ecological Reserves? <i>Andy Cutko</i>	Progress Report: Aligning the Northeastern States Research Cooperative and Forest Ecosystem Monitoring Cooperative <i>Elissa Schuett</i>	Staying relevant: a cooperatively-designed online database to house natural resource survey data collected by citizen scientists <i>Jason Hill</i>	From keystone initiatives to landscape programs: a decade of investing in forest conservation for birds-outputs, outcomes and lessons learned <i>Scott Hall</i>
Major species of the Northern Hardwood forest: evaluating trends and environmental drivers of growth in the state of Vermont <i>Rebecca L. Stern</i>	Trends (?) in Exchangeable Cations after Fifteen Years into a 150-Year Soil Monitoring Study <i>Don Ross</i>	Young and Old Forest Targets for an Ecologically Functional Landscape <i>Bob Zaino</i>	Establishing Baseline Distribution Data on Vermont's Reptiles and Amphibians: The 2018 Maps and Species to Watch <i>Jim Andrews</i>	Bird Conservation on Commercial Forests in the Northern Forest <i>Henning Stabins</i>
Long-term monitoring reveals forest community change driven by atmospheric deposition and contemporary climate change <i>Brittany Verrico</i>	Forest disturbance: there is more of it than you think <i>Jarlath O'Neil-Dunne</i>	Flower Brook Watershed Phosphorus Mitigation: Landscape Assessment and Project Implementation <i>Hilary Solomon</i>	Using remote-triggered camera traps to describe patterns of mammal species richness and abundance in relation to anthropogenic and ecological factors <i>Alyssa Valentyn</i>	What remote sensing tells us about the regions changing forests <i>Alison Adams</i>
Ecosystem services and biodiversity as outputs of forest stand development in the American Northeast <i>Dominik Thom</i>	Tracking Parcelization Over Time to Inform Planning and Policy <i>Jamey Fidel</i>	Bringing Vermont Conservation Design to Private Landowners in the VT Coverts Cooperator Network: Strategies, Challenges, and Areas of Opportunity <i>Carolyn D. Loeb</i>	Monitoring the Effects of Prescribed Burns on Common Nighthawk and Eastern Whip-poor-will Populations in New Hampshire's Ossipee Pine Barrens <i>Jason Mazurowski</i>	Using citizen science data in integrated population models to inform conservation <i>Orin Robertson</i>

## 2:40 – 3:00 Coffee Break *(Silver Maple)*

**3:00 – 4:30**

**Working Groups** (*Rooms listed below*)

*Proposed and organized by cooperators, these working group sessions provide opportunities to focus on key issues and priorities of members of the Cooperative*

**Confirmed working sessions include:**

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**By Land, Water, or Air: Invasive Species Management in a Changing Forest Landscape**

*Organizer:* Joanne Garton, Vermont Forests, Parks, and Recreation

*Location:* Chittenden Bank

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**Managing Climate Change Impacts: What Questions Still Remain?**

*Organizer:* Maria Janowiak, Northern Institute of Applied Climate Science

*Location:* Mildred Livak

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**Northeastern Forest, Wildlife, and Climate Change: Understanding Impacts and Planning for the Future**

*Organizer:* Toni Lyn Morelli, USGS – Northeast Climate Adaptation Science Center

*Location:* Frank Livak

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**Special Track Bird Conservation in the Year of the Bird**

*Organizer:* John Lloyd, Vermont Center for Ecostudies

*Location:* Jost Foundation

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**Data Scavenger Hunt and Lawn Game Social: Explore FEMC Tools, Play Games, Meet People**

*Organizer:* FEMC Staff

*Location:* Sugar Maple Ballroom

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**4:30 – 5:30**

**Poster Session and Social** (*Silver Maple*)

*Enjoy conversation, over 20 posters and a cash bar (21 and over only please) at the end of the day. Poster titles are listed at the end of the agenda.*

# Working Group Descriptions

## **By Land, Water, or Air: Invasive Species Management in a Changing Forest Landscape**

**Organizer:** Joanne Garton, Vermont Forests, Parks and Recreation

**Location:** Chittenden Bank

From our backyards to our backwoods, invasive plants and insects have found permanent homes in Vermont's forested landscapes. While invasive species are not a new topic for forest land managers, the list of invasive plant and insect species present in Vermont grows each year. Human movement, climate change, and related landscape-scale disturbances serve to exacerbate the spread and longevity of invasive species.

Join our panel of invasive species experts as they address the whys and hows of invasive species management across physical and regulatory landscapes. Using example project sites currently under state management, this workshop will address how the treatment of one invasive species may affect the spread of another, who can control these treatments, and what landowners and land managers need to create and implement invasive species management plans in Vermont's changing landscape.

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## **Managing Climate Change Impacts: What Questions Still Remain?**

**Organizer:** Maria Janowiak, Northern Institute of Applied Climate Science and Amanda Mahaffey, Forest Guild

**Location:** Mildred Livak

Climate change is a game-changing issue for the region's forests, and we all have a stake in maintaining their health over the long-term. A tremendous amount of scientific information has been produced in recent years, which is providing important information to natural resource managers in adapting forests to climate change. At the same time, many questions still remain. More science is needed to address managers' specific challenges in different parts of New England. This working group session will facilitate discussion among research scientists and forestry professionals to identify what science is most needed and help answer key management questions. The outcomes of this session will inform a broader effort by the Northern Institute of Applied Climate Science and Forest Stewards Guild to enhance the community of practice around the topic of forest adaptation.

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## **Northeastern Forest, Wildlife, and Climate Change: Understanding Impacts and Planning for the Future**

**Organizer:** Toni Lyn Morelli, USGS - Northeast Climate Adaptation Science Center

**Location:** Frank Livak

As global change complicates forest and wildlife management, better understanding of the impacts and potential responses are needed. From a regional perspective of predictions of land use and climate change on species distributions, to a multi-state perspective on carnivore and hare population dynamics, to a long-term look at bird responses on the Hubbard Brook Experimental Forest, this session will focus on the latest research on how climate change is impacting forest birds and mammals in the northeastern U.S. and provide examples of how this research can be used to aid management and conservation decisions.

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## Working Group Descriptions Continued

### **Special Track Bird Conservation in the Year of the Bird**

**Organizer:** John Lloyd, Vermont Center for Ecostudies

**Location:** Jost Foundation

Conservation of forest birds in the Northeast is a highly decentralized practice carried out by a host of groups, each with its own thematic and geographic focus. The populations we seek to conserve face a common suite of threats, and our organizations and agencies face a common set of challenges as we seek to implement effective conservation measures, yet we have few opportunities to learn from one another and to reflect on the state of our efforts.

In this Year of the Bird, we propose a special session on forest-bird conservation at the annual conference of the Forest Ecosystem Monitoring Cooperative. In doing so, we seek to offer a forum for sharing information on what works in bird conservation and for collectively identifying key knowledge gaps that hinder our collective efforts. The goal of the working session is to produce a consensus statement on the state of the practice and science of bird conservation across the Northern Forest. Working both in plenary and in topically focused breakout groups, we will answer the following questions:

Do our existing monitoring systems allow us to manage forest-bird populations adaptively? Are our current conservation solutions adequate in the short term (20 years), and how confident are we in our assessment? Are our current conservation solutions likely to prove adequate in the longer term (beyond 20 years), and how confident are we in our assessment? What information do conservation practitioners or policy-makers need, and how can scientists design research to provide it?

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### **Data Scavenger Hunt and Lawn Game Social: Explore FEMC Tools, Play Games, Meet People**

**Organizer:** FEMC Staff

**Location:** Sugar Maple

How many sugar maple cores are in the DendroEcological Network? How much forest tent caterpillar defoliation was mapped between 2002 and 2008? How acidic is precipitation in Vermont? Go on a scavenger hunt for these and more answers using FEMC tools, and reward yourself with a game of ladder ball, cornhole or bocce. This is a low-key time to learn more about some of the data-driven tools FEMC has developed and socialize with FEMC staff and your peers at the conference.

## Poster Titles and Presenters

Abstracts available online - <https://www.uvm.edu/femc/cooperative/conference/2018/agenda>

### **12-year forest trends in Acadia National Park**

Presenter: Aaron Weed, *National Park Service, Northeast Temperate Inventory and Monitoring Network, Woodstock, VT*

### **2018 Forest Ecosystem Monitoring Cooperative Partner Projects**

Presenter: Forest Ecosystem Monitoring Cooperative

### **26 Years of FEMC's Annual Forest Health Monitoring Program in Vermont**

Presenter: Josephine Robertson and Steve Rotella, *University of Vermont, Rubenstein School of Environment and Natural Resources and Forest Ecosystem Monitoring Cooperative*

### **Air temperature and humidity along an elevation gradient at Camel's Hump State Park, Vermont**

Presenter: John R. Butnor, *USDA Forest Service*

### **Assessment of Root System Quality in Container Grown Trees**

Presenter: Marie V. Ambusk, *Co-Founder*

### **Bumble Bee (*Bombus*) Distribution and Diversity in Vermont, USA: A Century of Change**

Presenter: Kent P. McFarland, *Vermont Center for Ecostudies*

### **The DendroEcological Network**

Presenter: Shelly A. Rayback, *Department of Geography, University of Vermont*

### **The Difference of Abundances and Richness between two bays and an inland sea**

Presenter: Spencer Roberge, *Student from Saint Michael's College*

### **Effects of fallen trees on wildlife species richness and abundance in the Saint Michael's College Natural Area**

Presenter: Risa Berman and Lauren Dunn, *Saint Michael's College*

### **Long Term Trends in the Density of Mayflies in the Middlebury Area.**

Presenter: Vickie Backus, *Middlebury College*

### **Modeling the effects of global change and associated adaptive silvicultural systems in Northern New Hampshire**

Presenter: Jennifer Santoro, *University of Vermont*

### **Monitoring ash on conserved lands in Vermont: Partnerships and potential for resilient**

Presenter: Allaire Diamond, *Vermont Land Trust*

### **The Northeastern Fragmentation Information Network: a clearinghouse containing a wealth of various resources to understand and address forest fragmentation**

Presenter: John Truong, *Forest Ecosystem Monitoring Cooperative*

### **The Northeastern Forest Health Atlas: A compilation of aerial surveys and field datasets related to forest health in the northeastern U.S.**

Presenter: Alexandra Kosiba, *Forest Ecosystem Monitoring Cooperative*

## Poster Titles and Presenters Continued

**The Power of Prioritization and Volunteers: Approaches for mitigating the impacts of non-native invasive plants**

Presenter: Elizabeth Spinney, *Vermont Department of Forests, Parks & Recreation*

**Relationship Between Climate and Growth for Northern Red Oak (*Q. rubra*), Eastern White Pine (*P. strobus*), and Eastern Hemlock (*T. canadensis*) in Northern Vermont**

Presenter: Kristen Switzer, *University of Vermont*

**Ten-year regeneration and structural responses to patch selection with legacy retention in second-growth, northern hardwood forests**

Presenter: Emma Sass, *University of Vermont*

**Vermont Forest Indicators Dashboard: Combining dozens of key datasets into a snapshot of the overall status of Vermont's forests**

Presenter: James Duncan, *Forest Ecosystem Monitoring Cooperative*

**Vulnerability of Forest Ecosystems in New England and New York to Climate Change**

Presenter: Maria Janowiak, *Northern Institute of Applied Climate Science, US Forest Service*

**Warblers and Snakes: Making the Most of an Agricultural Past**

Presenter: Dylan O'Leary, *TNC-VT Americorps Land Steward*

**What remote sensing tells us about the region's changing forests**

Presenter: Jennifer Pontius, *UVM and USFS NRS*

## Room Assignments for Contributed Talks Session 1

### Water and Climate

MILDRED LIVAK

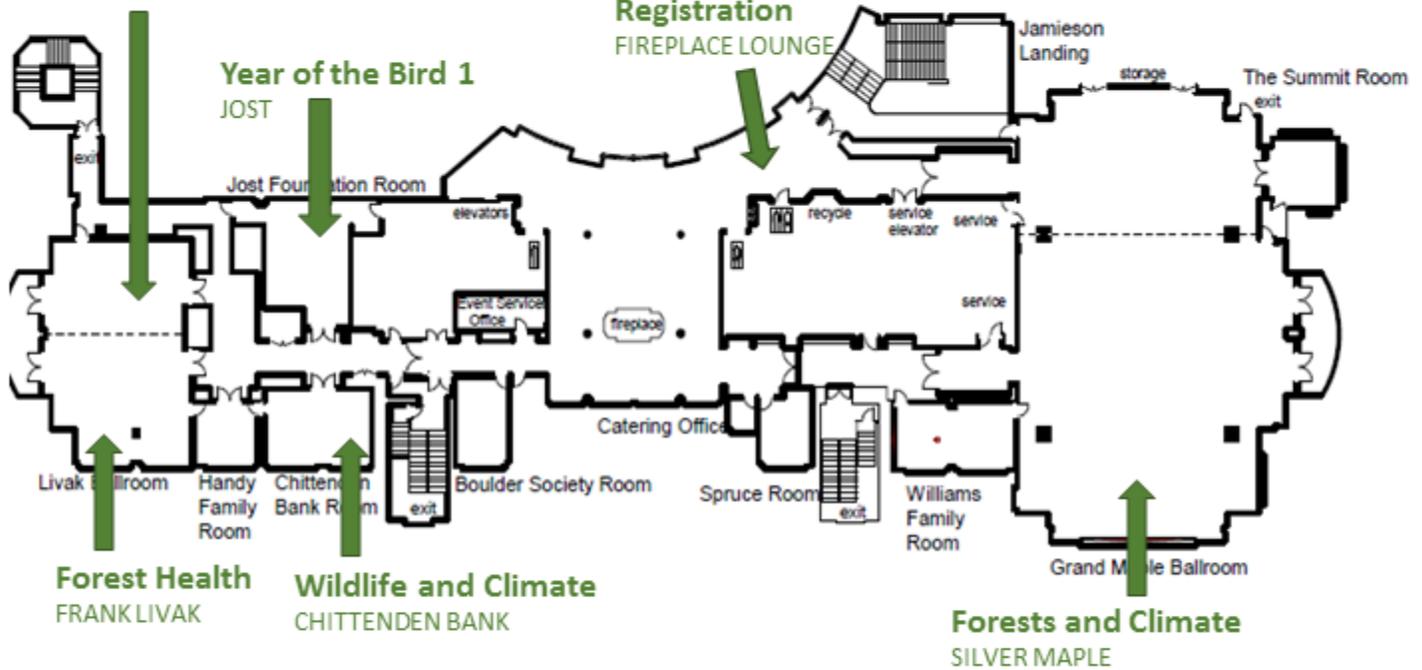
10:50 – 12:10

### Registration

FIREPLACE LOUNGE

### Year of the Bird 1

JOST



## Room Assignments for Contributed Talks Session 2

### Forest Monitoring

MILDRED LIVAK

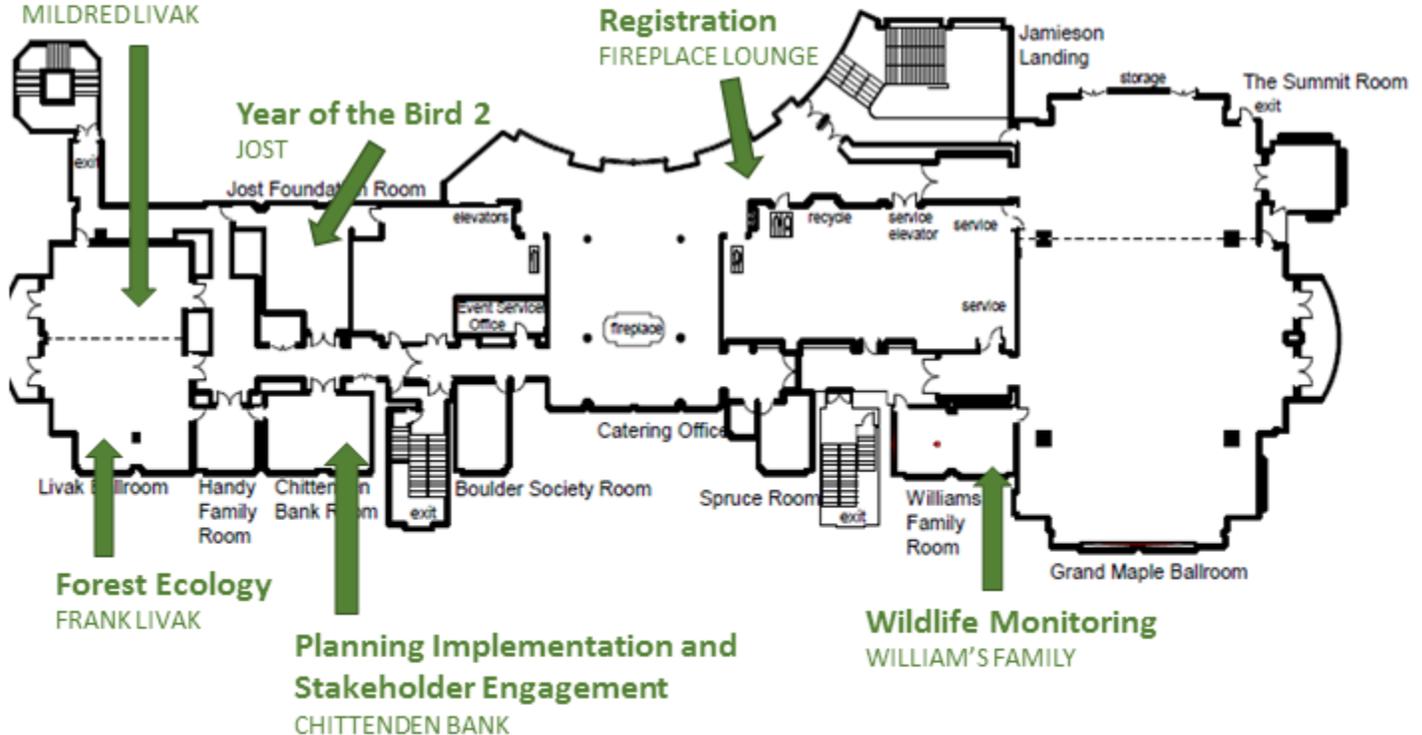
1:20 – 2:40

### Registration

FIREPLACE LOUNGE

### Year of the Bird 2

JOST

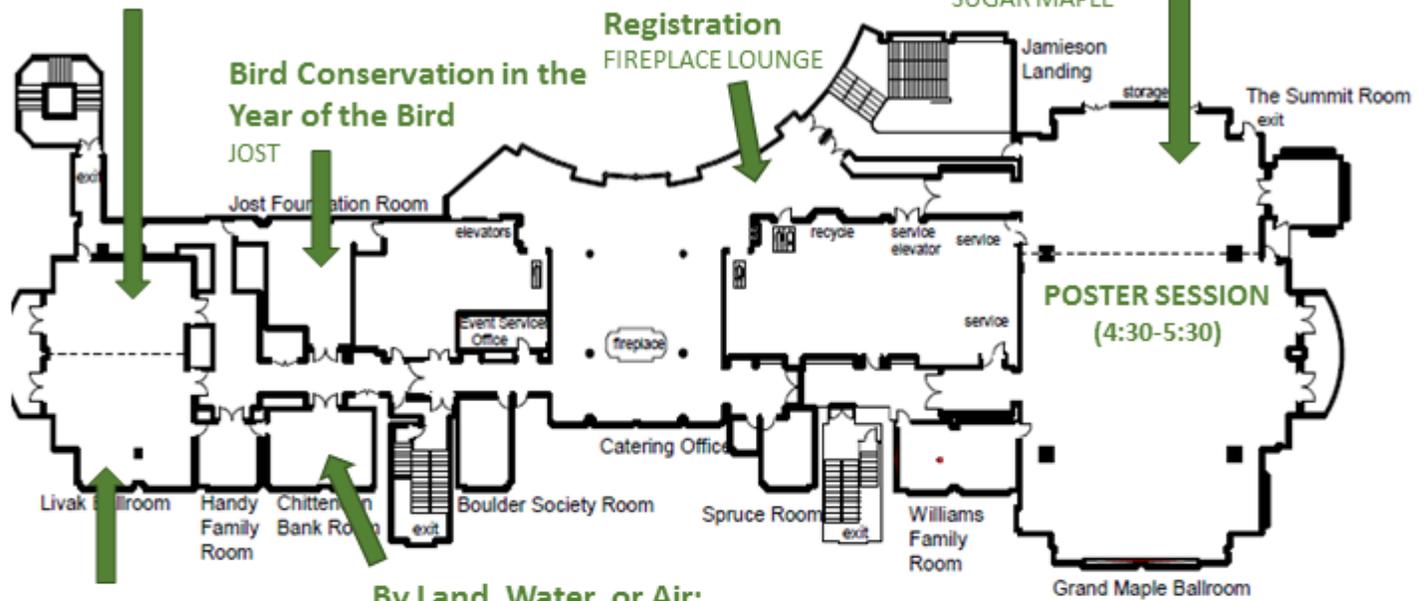


# Room Assignments for Working Groups and Poster Session

3:00 – 5:30

**Managing Climate Change Impacts: What questions still remain?**  
MILDRED LIVAK

**Data Scavenger Hunt and Lawn game social: Explore FEMC Tools, Play Games, Meet People**  
SUGAR MAPLE



**Bird Conservation in the Year of the Bird**  
JOST

**Registration**  
FIREPLACE LOUNGE

**Northeastern Forest Wildlife and Climate Change: Understanding impacts and planning for the future**  
FRANK LIVAK

**By Land, Water, or Air: Invasive Species Management in a Changing Forest Landscape**  
CHITTENDEN BANK

2018 Forest Ecosystem Monitoring Cooperative Conference

# Forests and Climate Change:

Managing impacts and planning for the future



## Bird conservation in the Year of the Bird

A special track at the annual Forest Ecosystem Monitoring Cooperative Conference

Burlington, Vermont  
December 14, 2018

Organized by:

John D Lloyd, Vermont Center for Ecostudies  
jlloyd@vtecostudies.org

Jim Duncan, Forest Ecosystem Monitoring Cooperative  
james.duncan@uvm.edu

## Problem statement

Conservation of forest birds in the Northeast is a highly decentralized practice carried out by a host of groups, each with its own thematic and geographic focus. The populations we seek to conserve face a common suite of threats, and our organizations and agencies face a common set of challenges as we seek to implement effective conservation measures, yet we have few opportunities to learn from one another and to reflect on the state of our efforts.

In this Year of the Bird, we are hosting a special track on forest-bird conservation at the annual conference of the Forest Ecosystem Monitoring Cooperative, held at the University of Vermont on December 14<sup>th</sup> (<https://www.uvm.edu/femc/cooperative/conference/2018/>). In doing so, we seek to offer a forum for sharing information on what works in bird conservation and for collectively identifying key knowledge gaps that hinder our collective efforts.

## Agenda and Topics

The track will include 8 invited talks by scientists and conservation practitioners from around the region. Speakers will be drawn from a variety of disciplines and will represent a range of stakeholders. Topics will include a gap analysis of regional monitoring efforts, a review of key threats facing bird populations in the

forests of New York and New England, examples of conservation interventions, and trends in some of the key drivers of change for forest birds.

These talks will set the stage for a working session that will round out the day's activities. The goal of the working session is to produce a consensus statement on the state of the practice and science of bird conservation across the Northern Forest. Working both in plenary and in topically focused breakout groups, we will answer the following questions:

- Do our existing monitoring systems allow us to manage forest-bird populations adaptively?
- Are our current conservation solutions adequate in the short term (20 years), and how confident are we in our assessment?
- Are our current conservation solutions likely to prove adequate in the longer term (beyond 20 years), and how confident are we in our assessment?
- What information do conservation practitioners or policy-makers need, and how can scientists design research and monitoring programs to provide it?

## Target audience

A key goal for the proposed track on forest-bird conservation is to bring together diverse perspectives on the conservation of forests and forest birds, and to use this diversity of experiences and outlooks to collectively generate an action-oriented framework for coordinated regional conservation, research, and monitoring. With this in mind, we actively seek participation from:

- Conservation scientists
- State and Federal wildlife and forestry agencies
- Consulting foresters
- Forest ecologists
- Land-use planners
- Forest-products industry
- Small woodlot owners
- Land trusts and other conservation practitioners

### **Photo credits:**

Mountain landscape, photo by Todd Ontl.

Ovenbird, photo by Bryan Pfeifer.