Great Lakes St. Lawrence Forest ASCC Workshop Goals

- An introduction to conceptual tools and resources designed to help integrate climate change considerations into natural resource management planning and decision-making;
- Discussion of regional climate change projections, impacts, and ecosystem vulnerabilities;
- Opportunity to apply concepts from the workshop in a scenario-based breakout activity; and
- Overview of a long-term North American climate change adaptation network that will have an installation at the Petawawa Research Forest.
**WORKSHOP AGENDA**

**July 16, 2019:**

8:00  Introductions & Workshop Overview
8:30  Climate Science Overview  
      (John Pedlar, CFS)
9:00  Climate Change Considerations for Silvicultural Decision-Making  
      (Linda Nagel, CSU)
10:00 Break
10:30 Ecology & Silviculture of the Great-Lakes St. Lawrence Forest  
      (Trevor Jones, CFS, and Peter Arbour, PRF)
11:00 Climate change impacts and vulnerabilities for the Great-Lakes St. Lawrence Forest  
      (Samuel Royer-Tardif, CFS)
11:30 Climate change in the Canadian Forest Service  
      (Jason Edwards, CFS)
12:00 Lunch
1:00  Overview of the Vulnerability Assessment for Climate Change (VACC) at the Petawawa Research Forest  
      (Michael Hoepting, CFS, & Jeff Fera, CFS)
1:30  Overview of Climate Change Adaptation and Mitigation Strategies  
      (Linda Nagel, CSU)
2:15  Breakout Exercise: Developing Climate Change Adaptation Approaches & Tactics  
      (Linda Nagel, CSU, Courtney Peterson, CSU, & Maria Janowiak, NIACS)
4:00  Group Report-Outs on Approaches and Tactics
4:45  Wrap-up & Evaluations
5:00  Adjourn
Activity #1

**Climate Change Considerations for Forest Management**

What new or different considerations do we need to think about when managing forests in the face of a changing climate?
Adapting to Climate Change

**Project Goals:**

1) Co-develop robust, operational examples of how to integrate climate change adaptation into silvicultural planning and on-the-ground actions to foster resilience to the impacts of climate change and enable adaptation to uncertain futures

2) Introduce managers to tools and approaches to integrate climate change into silvicultural decision making that meets management goals and objectives

**Adaptive Silviculture for Climate Change (ASCC)**
Intentionality

- Explicitly consider and address climate change
- Sure we might get lucky...
- Intentionally assessing risk and vulnerabilities makes our plans more robust!
Climate-Driven Changes

What actions can be taken to enhance the ability of a system to cope with change and meet goals and objectives?
**Adaptation** is the adjustment of systems in response to climate change.

Ecosystem-based adaptation activities build on **sustainable management, conservation, and restoration** principles.

### Adaptation Concepts

- **Manage for Persistence:**
  - Ecosystems are still recognizable as being the same system (character)

- **Manage for Change:**
  - Ecosystems have fundamentally changed to something different

#### Resistance
- Reduce impacts/ Maintain current conditions

#### Resilience

#### Transition (Response)
- Forward-looking/ Promote change
OPTION #1 – RESISTANCE

Improve the defenses of the forest against anticipated changes or directly defend the forest against disturbance in order to maintain relatively unchanged conditions

- Short-term
- High-value

**OPTION #1 – RESISTANCE**

Desired Future Condition

Climate Change Trajectory

TIME

?
OPTION #1 – RESISTANCE

Accommodate some degree of change, but encourage a return to a prior condition after disturbance.

OPTIONS:
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Desired Future Condition

Climate Change Trajectory

TIME

OPTION #2 – RESILIENCE

OPTION #3 – TRANSITION (RESPONSE)

Intentionally accommodate change and enable ecosystems to adaptively respond to changing/new conditions

Millar et al. 2007, 2008
**OPTION #3 – TRANSITION (RESPONSE)**

- **Improve defenses of forest against change**
- **Maintain relatively unchanged conditions**
- **Accommodate some degree of change**
- **Return to prior condition after disturbance**
- **Facilitate change**
- **Enable ecosystem to respond to new and changing conditions**

**Adaptation Options**

**RESISTANCE**
- Improve defenses of forest against change
- Maintain relatively unchanged conditions

**RESILIENCE**
- Accommodate some degree of change
- Return to prior condition after disturbance

**TRANSITION**
- Facilitate change
- Enable ecosystem to respond to new and changing conditions

Design actions that are **robust across a range of potential future conditions**
Planning Adaptation


Forest Adaptation Resources

Strategies & Approaches
Menu of adaptation actions

Adaptation Workbook
Structured process to integrate climate change considerations into management.
- Workbook

Also online: AdaptationWorkbook.org
Adaptation Workbook

1. DEFINE management objectives

2. ASSESS climate impacts

3. EVALUATE management objectives.

4. IDENTIFY adaptation tactics.

5. MONITOR and evaluate effectiveness.

Adaptation Strategies & Approaches

Options (concepts):
- Resistance, Resilience, Transition

Strategies:
- Regionally specific conditions

Approaches:
- Actions for a specific ecosystem

Tactics:
- Prescriptions for local conditions and mgmt. objectives


www.adaptationworkbook.org/niacs-strategies
Example:

**Strategy 3**: Reduce the risk and long-term impacts of severe disturbances.

**Approach 3.1**: Alter forest structure or composition to reduce risk or severity of wildfire.

**Tactics 3.1.1**: Using prescribed fire and thinning to reduce surface fuels, increase height to live crown, decrease crown closure, and create a more open forest structure that is expected to be less vulnerable to severe wildfire.

**Adaptation Strategies & Approaches**

**Why it’s important**: Helps connect the dots from broad concepts to specific actions for implementation.
One last thought....

Adaptation actions may not look that different from current management actions, especially in the near term.

*individual results will vary
Activity #2

Developing Adaptation Actions for Forests

In this activity you will use your silvicultural expertise to illustrate how climate change and uncertainty may affect stand-level management for specific ecosystems or forest types.
Activity #2

As a group, select a forest type or ecosystem to work in

1) Create and describe a hypothetical management situation
   - **Conditions:** Location, site conditions, species composition, stand structure, disturbance history and susceptibility, etc.
   - **Typical management:** Management goals and objectives, common practices

Activity #2

As a group, select a forest type or ecosystem to work in

2) Identify important climate change considerations
   - Anticipated effects on various forest components
   - Characteristics that increase/reduce vulnerability

3) Identify challenges or opportunities for meeting management goals under climate change
Activity #2

To help think about climate change in your region

- Precipitation change (summer and winter)
- Temperature change (summer and winter)
- Change in climate moisture index (summer and winter)

Maps/data for this section courtesy of Canadian Center for Climate Services Climate Data Viewer

Activity #2

What actions can be taken to enhance the ability of the area to adapt to anticipated changes and meet management goals?

Expand and Re-envision your silvicultural toolbox
Activity #2

What actions can be taken to enhance the ability of the area to adapt to anticipated changes and meet management goals?

Where are you working, and what are your forest management goals?
Forest:
Location and conditions:
Current management:

What climate change impacts create challenges or opportunities for meeting these goals?

What actions would you recommend to enhance the ability of forests to adapt?

Adaptation Tactics:
1) 
2) 
3) 

Adaptation Workbook

A **structured process** to integrate climate change considerations into management planning and activities

1. **DEFINE** area of interest, management objectives, and time frames
2. **ASSESS** climate change impacts & vulnerabilities for the area of interest.
3. **EVALUATE** management objectives given climate impacts and vulnerabilities.
4. **IDENTIFY** and implement adaptation approaches and tactics.
5. **MONITOR** and evaluate effectiveness if implemented actions.

Vulnerability Assessments

Resources

- Swanston et al. 2016. Forest Adaptation Resources: Climate change tools and approaches for land managers. USDA GTR NRS-87
- www.forestadaptation.org
- www.adaptationworkbook.org