



United States Department of Agriculture

USDA Forest Service Climate Change Education Modules: Something for Everyone

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Climate Change Resource Center
www.fs.usda.gov/ccrc/

Northern Institute of Applied Climate Science



Climate

Carbon

Provides **practical** information, resources, and **technical assistance** related to forests and climate change

Regional multi-institutional partnership among:



Michigan Technological University



ncasi



The UNIVERSITY of VERMONT

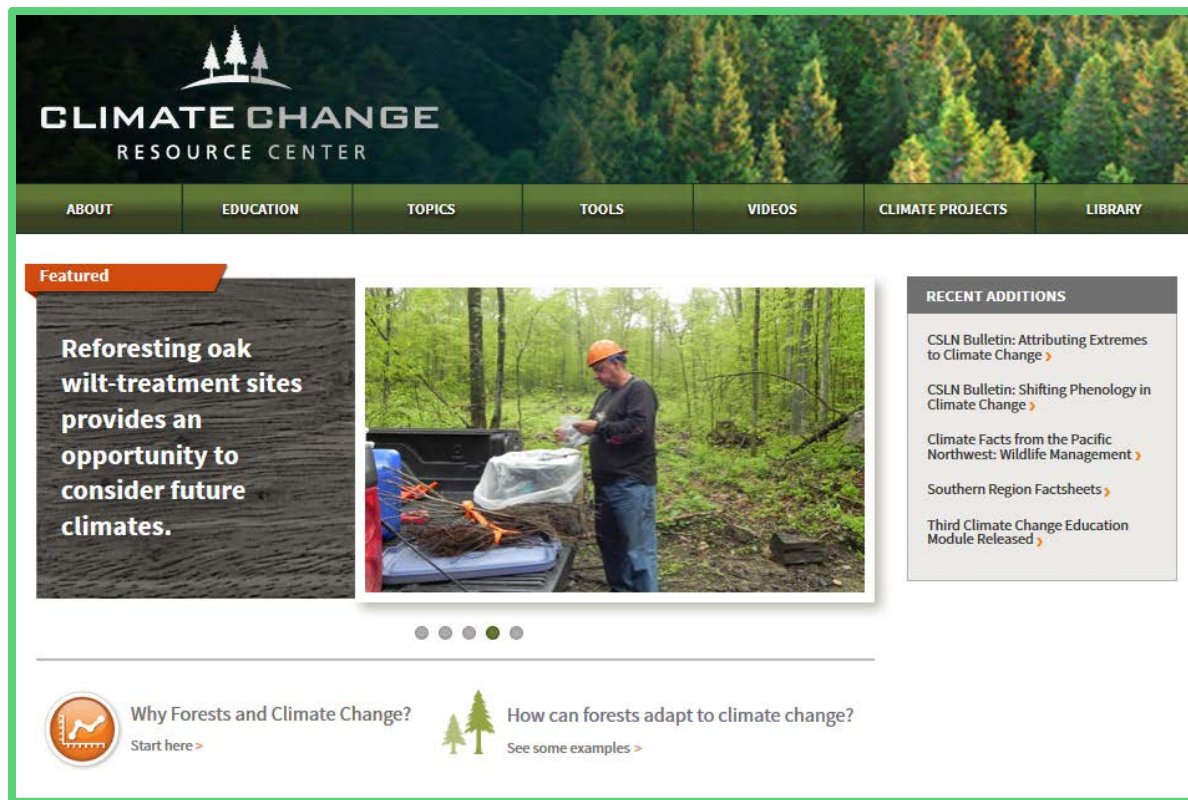


UNIVERSITY OF MINNESOTA



Climate Change Resource Center

www.fs.usda.gov/ccrc/



The screenshot shows the homepage of the Climate Change Resource Center. At the top, there is a header with the logo "CLIMATE CHANGE RESOURCE CENTER" and a navigation menu with the following items: ABOUT, EDUCATION, TOPICS, TOOLS, VIDEOS, CLIMATE PROJECTS, and LIBRARY. Below the navigation menu, there is a "Featured" section with a large image of a person in a forest. The text next to the image reads: "Reforestation oak wilt-treatment sites provides an opportunity to consider future climates." To the right of the featured section is a "RECENT ADDITIONS" section with the following items: "CSLN Bulletin: Attributing Extremes to Climate Change", "CSLN Bulletin: Shifting Phenology in Climate Change", "Climate Facts from the Pacific Northwest: Wildlife Management", "Southern Region Factsheets", and "Third Climate Change Education Module Released". At the bottom of the page, there are two icons: a line graph icon with the text "Why Forests and Climate Change? Start here >" and a tree icon with the text "How can forests adapt to climate change? See some examples >".

CLIMATE CHANGE
RESOURCE CENTER

ABOUT EDUCATION TOPICS TOOLS VIDEOS CLIMATE PROJECTS LIBRARY

Featured

Reforestation oak wilt-treatment sites provides an opportunity to consider future climates.

RECENT ADDITIONS

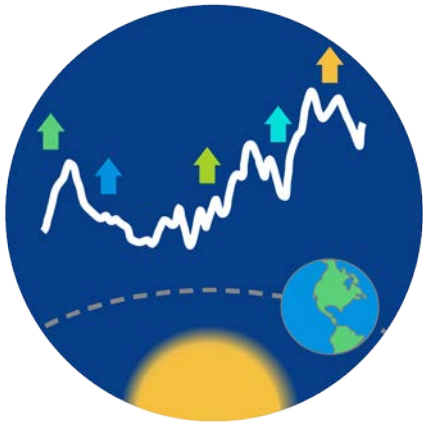
- CSLN Bulletin: Attributing Extremes to Climate Change >
- CSLN Bulletin: Shifting Phenology in Climate Change >
- Climate Facts from the Pacific Northwest: Wildlife Management >
- Southern Region Factsheets >
- Third Climate Change Education Module Released >

Why Forests and Climate Change?
Start here >

How can forests adapt to climate change?
See some examples >

Education Modules

www.fs.usda.gov/ccrc/education



Climate Change: What You Need to Know

Accessible Climate Change Information

Forest Service Climate Change Performance Scorecard Element One

Employee Education



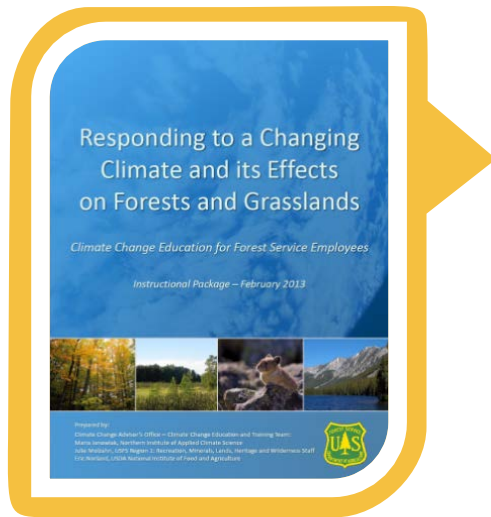
1. Are all employees provided with training on the basics of climate change, impacts on forests and grasslands, and the Forest Service response?

Fill a need for basic climate change education in National Forests units



Forest Service Curriculum

Climate Change Advisor's Office Climate Change Education and Training Team



- Key concepts
- Templates and formats for training
- Extra resources, materials, and videos
- Available on climate change advisor intranet
- AgLearn Assessment

What is an Education Module?

“A short course of study that together with other completed courses counts towards a particular qualification”



Short Course



Interactive



Online



Relevant
Activity



Best Available
Science



Useful

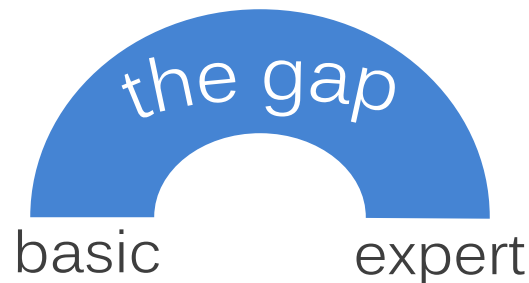
www.fs.usda.gov/ccrc/education

Something for Everyone: More than a 101



- Pop-up boxes
- Outside links
- Citation links
- Graphics and animations
- Scientific graphs

- Clarifying information
- Learning relevant facts
- Providing definitions
- Introducing credible sources

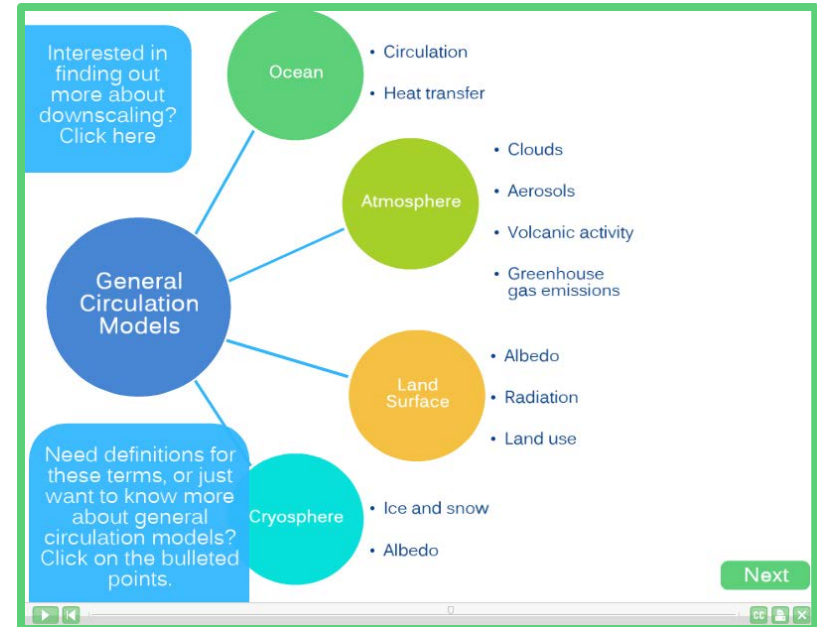
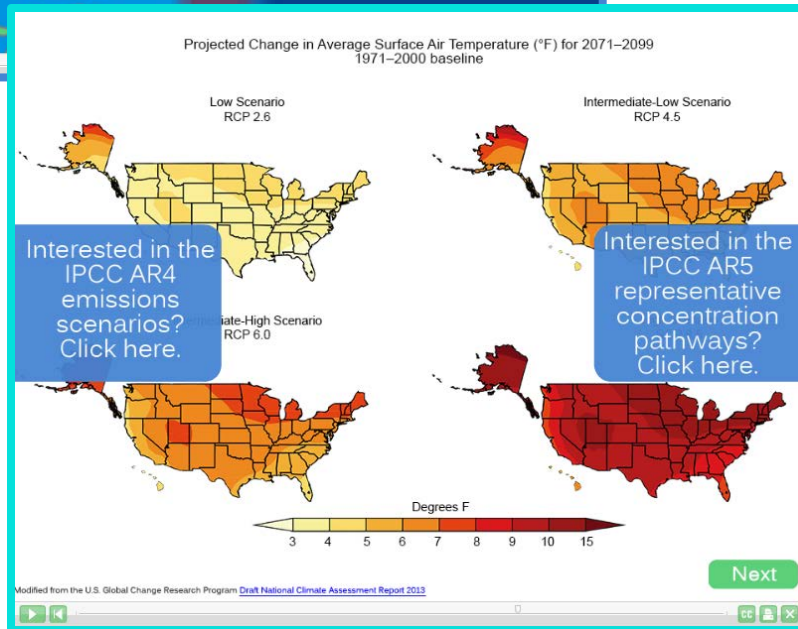
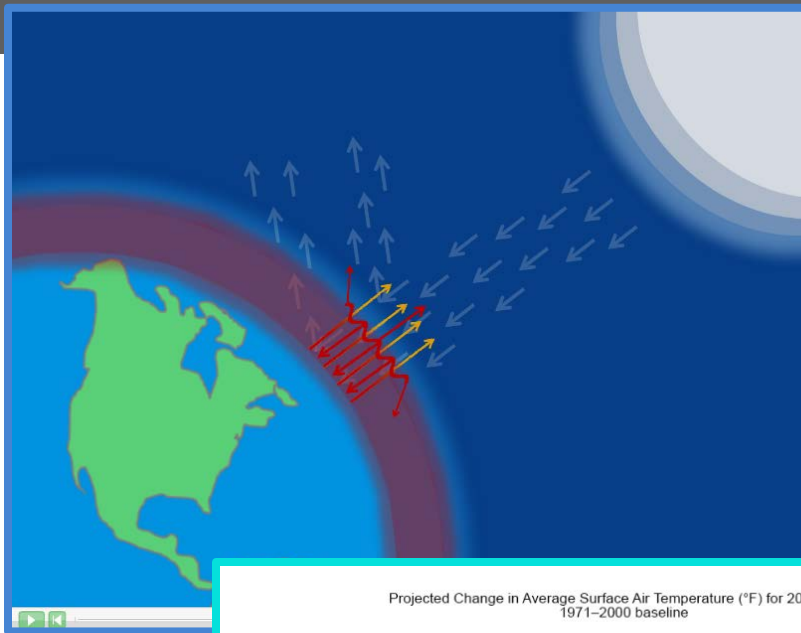


Climate Change Science and Modeling

By the end of this module, users should know:

- Difference between weather and climate
- Main greenhouse gases
- Greenhouse effect
- Carbon cycle
- Observed climate change impacts by region
- Climate models and the uncertainty
- Emissions scenarios storylines and representative concentration pathways
- Projected future climate impacts

Climate Change Science and Modeling



Climate Change Effects on Forests and Grasslands

By the end of this module, users should know:

- Interactions between climate change effects
- Variations in observed and projected changes around the country
- Changes in precipitation patterns
- Phenological changes and growing season length
- Carbon dioxide fertilization
- Changes in vegetation and wildlife habitat ranges
- Disturbances like insects, invasives, and wildfire

Climate Change Effects on Forests and Grasslands



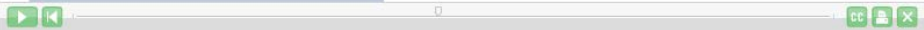
Vegetation | Water Use

Coconino National Forest Lincoln National Forest

- The Coconino National Forest in central Arizona has been experiencing a rapid decline in its aspen population.
- The recent aspen decline is large scale, affecting many aspen stands in the Southwest. The decline is mainly attributed to severe droughts.
 - Many parts of the Southwest, including the Coconino National Forest, experienced a very warm drought period in the late 1990s. This was followed by episodes of insect activity.
 - Regeneration in aspen stands has been low for over a century in many parts of the Southwest due to heavy browsing by livestock and wild ungulates and the encroachment of conifers into aspen understory.
 - Aspen mortality was 95% in dry low-elevation sites on the Coconino National Forest, compared to 61% on the mid-elevation sites.
 - The Coconino National Forest is currently working on the Hart Prairie Fuels Reduction and Forest Health Project. This project will restore over 300 acres of aspen in the Forest.
 - Restoration efforts for aspen include removal of encroaching conifers, prescribed fire, planting, and fencing.

For more information visit the [Coconino National Forest](#).

Next

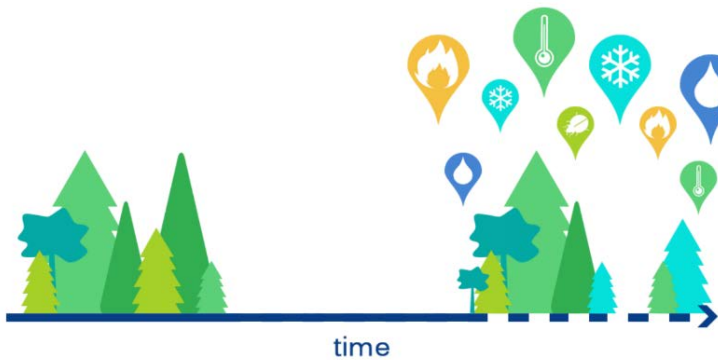


Responses to Climate Change

By the end of this module, users should know:

- Adaptation options: resistance, resilience, and transition
- Differences and similarities between resistance, resilience, and transition
- Benefits and risks for adaptation options
- The adaptation planning process
- Mitigation options for land management
- Differences between adaptation, mitigation, and restoration

Responses to Climate Change



The Nature Conservancy Adaptation Forestry in Minnesota's Northwoods

The Minnesota Northwoods Project is located on a mix of federal, state, and county land in northeast Minnesota and is a collaboration of several different organizations. The project area features mostly boreal species such as aspen and white spruce. The main goal of this project is to try alternative silvicultural strategies to promote diverse forest-stand structures and incorporate new tree species and genotypes through planting.

- Projected climate change effects for the area include increased temperature and more drought stress during the growing season, along with shorter winters and less snowfall.
- The current adaptation approach includes establishing a new mix of native species through plantings of tree seedlings projected to be better suited for future climate. All species being planted (such as burr oak) are native to the region and are anticipated to thrive under future climate.
- The overall adaptation option for the Northwoods Project can be considered a transition option, because planting promotes a change in forest composition that will likely be better suited for expected climate effects.

For current project status and more information, visit the [Adaptation Forestry in Minnesota's Northwoods demonstration summary](#).

Want to see examples of other adaptation guides?
Click here.

What data will show whether those actions were effective?

Interested in working through this process online?
Click here.

What actions can help systems adapt to change?

Click on the **i** for a technical definition of the five steps.

DEFINE

Where is the system located and what is valued?

Forest Adaptation Resources

ASSESS

How is this particular place vulnerable to climate change?

MONITOR

IDENTIFY

EVALUATE

What challenges or opportunities does climate change present?

Next

Quiz-like Activity

Climate Change Science and Modeling Activity

To begin the activity, click on your region.

Alaska Northwest Southwest Great Plains Midwest Southeast Northeast

If your region is an island, please select the mainland region closest to you.

Climate Change Effects on Forests and Grasslands Activity

To begin the activity, click on your region.

West East

If your region is an island, please select the mainland region closest to you. Alaska is not represented in the modeling, but some of the West region will be applicable.

This activity uses species distribution models. What are species distribution models, and what other kinds of models are there? [Click here to find out more.](#)

Responses to Climate Change Activity

Create your own adaptation plan. Click on an ecosystem to get started.

Yellow-cedar Cold-water Fish Habitat Ponderosa Pine Prairie and Wildlife Longleaf Pine Savannas Water Supply Lands Northern Hardwoods

Climate Change Science and Modeling Activity

What is the average temperature change over the last 100+ years?

Change in annual temperature 1895–2011

6
5
4
3
2
1
0
-1

Douglas-fir trees are drought tolerant, mostly shade intolerant, adapted to periodic fire, and susceptible to bark beetles.

A. 2 to 3 degrees Fahrenheit
B. 1 to 2 degrees Fahrenheit
C. 0 to 1 degrees Fahrenheit

Submit

Question 1 of 14

Climate Change Effects on Forests and Grasslands Activity

Based on the information about Douglas-fir and its current suitable habitat, which climate effects do you think might decrease growth and distribution? **Select all that apply.**

If you would like to change your answers before submitting, please use the Reset button.

Current modeled distribution

0 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.0

A. Increases in moisture stress
B. Increases in wildfire activity
C. Longer growing season
D. Increases in insect outbreak cycles

Incorrect. A longer growing season would not likely decrease Douglas-fir growth and distribution. In fact, with adequate nutrients, a longer growing season might increase growth. Click Reset to try again.

Reset Submit

Question 2 of 10

Responses to Climate Change Activity

Your Adaptation Plan:

- My ecosystem is: a northern hardwoods forest in the Midwest
- My main management goal is: to maintain a diverse, multi-aged forest capable of producing a consistent supply of wood products
- More frequent heavy precipitation events are an expected climate change effect, and exposed soils and steep topography could make my site more sensitive to this change.
- A climate change challenge for my ecosystem is: a longer growing season that may give non-native species like buckthorn an advantage over native species
- I chose to adapt to this climate change challenge by: identifying and treating existing non-native species with herbicide, and cleaning equipment prior to harvest operations, in order to prevent the spread of non-native species
- A climate change opportunity for my ecosystem is: warmer future temperatures that may favor some species already present within the forest
- I chose to take advantage of this opportunity by: planting seedlings and encouraging regeneration of native tree species expected to fare better under climate change

If you'd like to print this plan, click the print button located on the right-hand side of the playbar.

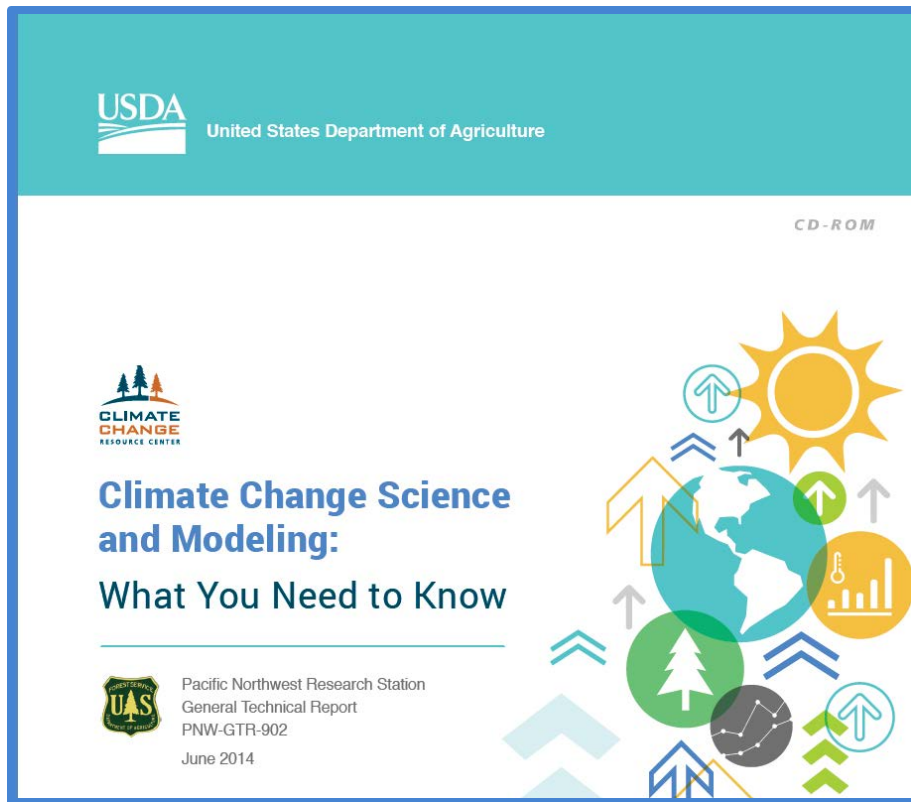
Print

Next

User-directed • Regionally focused • Feedback messages • Personalized certificate

“Responding to a Changing Climate and its Effects on Forests and Grasslands”

Something for Everyone: Partnerships



- A Framework for Building Climate Literacy and Capabilities among Federal Natural Resource Agencies
- Department of Navy
- Department of Defense

Something for Everyone: DON

CCRC + NFCH + DON CECOS



- Naval Civil Engineer Corps Officer School
environmental training
- Facilitate education module + add more info
- Mixed audience
- Interest in sea level rise
- Beaches

Something for Everyone: DOD

CCRC + NFCH + DON = DOD partnership



- Natural resource compliance course with climate adaptation workshop
- “Guest” expert speakers from the region
- Intro to adaptation concepts and processes
- Activities to identify challenges, benefits to climate change, brainstorm adaptation strategies, approaches, and tactics for a management scenario

Something for Everyone



Something for Everyone

Watch!

www.fs.usda.gov/ccrc/education

Order!

For hard-copy CDs, mail PNW publishing:

pnw_pnwpubs@fs.fed.us

Request PNW-GTR-902 for Climate Change Science and Modeling

Request PNW-GTR-916 for Climate Change Effects on Forests and Grasslands

New
Module!

Responses to Climate Change: What You Need to Know
PNW-GTR-955 publishing is in process.



United States Department of Agriculture

Thank you!

Questions?

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