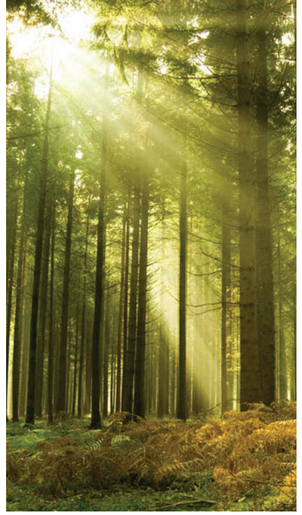

Helping People Help the Land

NRCS provides America's farmers and ranchers with financial and technical assistance to voluntarily put conservation on the ground, not only helping the environment but agricultural operations, too.

www.in.nrcs.usda.gov

NIACS
Northern Institute of Applied Climate Science

The Northern Institute of Applied Climate Science (NIACS) has been designed as a collaborative effort among the Forest Service, universities, conservation organizations, and forest industry to provide information on managing forests for climate change adaptation and enhanced carbon sequestration.

www.niacs.org

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USDA United States Department of Agriculture

CLIMATE CHANGE, YOUR FOREST AND YOU

INDIANA

Forests are always changing and adapting to new conditions, including recent changes in our climate[1, 3, 4]. The USDA's Northern Forests Climate Hub and Northern Institute of Applied Climate Science have identified tools and approaches[2] to help landowners adapt to climate change. The conservation programs offered by the Indiana Natural Resources Conservation Service (NRCS), can help private landowners achieve these goals through technical and financial assistance. Below are some examples of how adaptation strategies and NRCS programs can help you steward your forest resources and prepare for climate change impacts.

HOW IS CLIMATE CHANGE IMPACTING MY FOREST?

For a full description of climate change impacts on Indiana forests, view the Climate Explorer Tool at: https://adaptationworkbook.org/explore-impacts.

TEMPERATURE INCREASES

Temperatures in Indiana have risen 1.2° F since 1895, and are projected to increase by 6-10° F by late century. This affects deer browse pressure, length of growing season, and drought stress, all of which can impact survival of trees and seedlings, and rates of tree respiration and evapotranspiration.

PRECIPITATION CHANGES

Average annual precipitation in Indiana has increased by 5.6 inches; winters and springs are projected to be much wetter by mid-century. By late century, summer precipitation is projected to decline by nearly 8%. Extreme rainfall events are becoming more common across the Midwest, and are expected to continue to intensify throughout the century. Heavy rainfall has significant impacts on soil moisture, frozen ground duration, flooding, surface runoff, and infrastructure.

SOIL MOISTURE AND DROUGHT STRESS

Drought stress may increase due to warmer conditions, longer growing seasons, and longer periods between rainstorms. During more frequent intense rain events our water will be lost to runoff rather than being stored in the soil, which will also increase drought stress. Drought stress can make trees more vulnerable to insect outbreaks and diseases. Even though total mean annual precipitation has been and is likely to continue to increase, these factors may lead to net drier conditions for Indiana's forests. There is some evidence that elevated carbon dioxide in the atmosphere may help some tree species withstand short-term drought stress.

WHAT CAN I DO?

Whether you are concerned about climate change impacts or are just interested in what you can do to keep your forest healthy and productive, NRCS has programs that can provide the technical and financial assistance to help you achieve your goals and objectives.

CONSERVATION STEWARDSHIP PROGRAM (CSP)

Helps landowners maintain conservation stewardship and implement conservation practices. Benefits keep land management more sustainable and profitable and improve our natural resources.

ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP)

Provides technical and financial help to landowners for conservation practices that protect soil and water quality.

WHERE DO I START?

Contact your local USDA Service Center at https://offices.sc.egov.usda.gov/locator/app. NRCS can help connect you with a professional forester that will get you started with a **FOREST MANAGEMENT PLAN**. A forest management plan will help you:

- Identify your **GOALS** and **OBJECTIVES**,
- consider how climate change will affect your land, and
- select adaption strategies and conservation practices.

EXAMPLES:

OBJECTIVE: IMPROVE DEGRADED PLANT COMMUNITIES

ADAPTATION STRATEGIES: Sustain fundamental ecological functions, maintain and enhance species and structural diversity.

CONSERVATION PRACTICE: Forest Stand Improvement

Reducing tree density creates open forest conditions, which promotes the health and vigor of the residual trees by reducing competition for moisture, nutrients, and light. Understory vegetation management, along with the proper spacing between trees, allows for plant regeneration, provides visual appeal and habitat for many at-risk wildlife species, and lowers the risk of wildfire. This could facilitate a follow-up treatment with prescribed burning.

OBJECTIVE: INCREASE NATIVE PLANTS

ADAPTATION STRATEGIES: Maintain and enhance genetic diversity, facilitate community adjustments through species transitions.

CONSERVATION PRACTICE: Tree/Shrub Establishment

This strategy focuses on encouraging tree species that are expected to be adapted to future conditions, whether through new mixes of species being planted or protecting future-adapted seedlings. For example, new species can be planted to replace ash trees lost to emerald ash borer (EAB). Increasing stand-level diversity and function addresses a wide array of resource concerns, increases stand resiliency to climate change, and strengthens ongoing management activities. Additional benefits may include increasing carbon storage and providing more diverse wildlife habitat and food sources.

OBJECTIVE: MIMIC NATURAL DISTURBANCES

ADAPTATION STRATEGIES: Sustain fundamental ecological functions, reduce the risk and long-term impacts of severe disturbances.

CONSERVATION PRACTICE: Prescribed Burning

Prescribed burning involves applying controlled fire to a predetermined area to support one or more of the following purposes: controlling undesirable vegetation or plant disease; preparing or enhancing sites for harvesting, planting, or seeding; reducing wildfire hazards, slash, or debris; improving wildlife habitat, plant production, quantity, or quality; facilitating distribution of grazing and browsing animals; and restoring or maintaining a particular ecological state of a site.

OBJECTIVE: REDUCE INVASIVE SPECIES

ADAPTATION STRATEGIES: Sustain fundamental ecological functions, reduce the impact of biological stressors.

CONSERVATION PRACTICE: Brush Management

Brush management can be used to improve or restore native habitats and reduce invasive species. Treating invasive and noxious plant species can reduce sedimentation, improve water quality and maintain or increase wildlife habitat and values. This practice allows for the use of herbicides or mechanical treatments to remove weeds and invasive species. The goal of this practice is to allow desired plant communities and wildlife habitats to re-establish in the forest, and to reduce stress and competition on the desired species.

OTHER RESOURCES AVAILABLE

Forestry practices are available through the NRCS, including alley cropping, firebreaks, stream crossings, forest trails and landings, prescribed fire, and more; visit your local USDA Service Center or www.in.nrcs.usda.gov for more information.

The NRCS can help you consider climate change impacts in conservation planning. More adaptation strategies and approaches are available, including promoting landscape connectivity, and providing refugia for desired and protected species that may be vulnerable to changing stressors; visit the Climate Change Response Framework website at: www.forestadaptation.org/adapt.

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