

# Earth Day

*“The wealth of the nation is its air, water, soil, forests, minerals, rivers, lakes, oceans, scenic beauty, wildlife habitats and biodiversity...that’s the whole economy. These biological systems are the sustaining wealth of the world.” Gaylord Nelson, 1995, 25 Anniversary of Earth Day Speech.*

It was a concept by Wisconsin Senator Gaylord Nelson, who in 1969 proposed a national “teach-in” to increase environmental awareness. This teach-in led to congressional legislation and the creation of the National Day of Environmental Awareness and Action that we celebrate today...Earth Day

On April 22, 1970, the first Earth Day was held. People all over the country made promises to help the environment. Everyone got involved and since then, Earth Day has spread all over the planet. People all over the world, celebrate Earth Day and perform activities and work on projects to benefit the Earth and the environment.

## **Focus for Earth Day -- Climate Change**

### **The Forest and Climate Change**

#### *Is the climate really changing?*

You may have heard many different opinions about climate change, whether it is happening or not, what the cause may be and lots of debate about the subject. Most scientists agree on one thing about climate change – that measured and recorded changes in Earth’s temperature over the past 100 or more years point to a warming of Earth’s surface, greater than they would have expected from “normal” temperature cycles.

Normal cyclic changes in Earth’s ocean currents and atmospheric pressure cause changes in weather and climate patterns on land. The Earth has many different oceanic and atmospheric cycles – some are short term cycles like El Nino (occurring every 4-7 years), while others can change every 20-30 years and some are even longer cycles, lasting 1,500 years or more! Each of these cycles has a cool phase and a warm phase that occur when Earth’s climate either cools a little or warms a little. These changes affect the moisture and weather patterns we experience.

Over the past 150 years, ever since the beginning of the Industrial Revolution, the amount of “greenhouse gases” (carbon dioxide, methane and nitrous oxide) trapped in the atmosphere has risen sharply. Increases in greenhouse gases associated with the burning of fossil fuels like oil, coal and natural gas, trap more of the sun’s heat. This can lead to increasing temperatures on Earth. The effects of temperature change will be different in different places. Some places

will experience warming with periods of heavy rain and others will experience periods of low rainfall and warmer temperatures.

### ***Moving up - in response to climate change?***

As the climate changes, trees and other plants may grow in places they didn't inhabit before. Some trees and plants may die off or grow very slowly in some areas, or they may start growing in new areas. For example, trees that grow in the southern United States could begin to grow only in locations that are farther north. Some animals like the wolverine have specific habitat requirements for survival, like alpine meadows and conifer forests. As the climate changes and spring snow melts earlier, the wolverines' range may shift to more northern and colder areas where there is a prolonged spring snowpack. As the climate changes, many plants, insects, fish and animals may shift their habitat, if they can, to areas that are more favorable to their survival.

### ***How do we work with this change?***

Humans need to take steps to reduce the impact of climate change where they can; however, we also need to be aware of what these changes mean and try to adapt. Since we don't know exactly how changes in temperature will change the climate, scientists use math, science and research to predict what changes may occur. Climate change is challenging for everyone and it's causing us to think in new ways and do things differently, every day.

### ***What is the value of a tree?***

National forests provide wood, minerals, oil and gas, wildlife habitat and areas for outdoor recreation. The forests are also critical to provide clean water and clean air. Although often overlooked, trees are invaluable to us for many reasons! Trees work as natural filters for our air by removing pollutants; They shade streams and water-bodies to keep water cool for fish; Their roots stabilize soil; Trees collect snow and provide shade to retain snow longer in the spring and most important of all - trees store carbon!

### ***A roadmap for forest management***

We need to understand the way forests and other natural ecosystems grow and change. In the 21<sup>st</sup> century, climate smartness involves managing natural resources to be resilient to disturbances like wildfires, insect and disease infestations and frequent, extreme weather events. Climate smartness in forest management will support diverse and productive forests and grasslands that benefit us all through time.

A recent "[National Climate Assessment](#)" compiled over 1000 scientific studies describing anticipated changes in the future that the Forest Service will have to address. Its findings predict that the area burned by wildfires is expected to double over the next 25 years, and insect infestations will affect more land per year than wildfires. National forests and grasslands need to continue to benefit the American public over time. Therefore, climate change has become a primary consideration to include in the management of national forests and grasslands.

The [National Roadmap for Responding to Climate Change](#) focuses on a few key areas:

- Incorporating the best science into natural resource management; this involves partnerships between land management agencies, and the scientific and research communities.
- Identifying which forest resources are most vulnerable to the effects of climate change and focusing management practices to those resources; then monitor and adapt to the changes over time.
- Reducing our “environmental footprint” through forest management, managing for sustainability and utilizing “green practices.”

## **The GMUG National Forest and Climate Change**

The Grand Mesa, Uncompahgre and Gunnison National Forests prioritized several areas to manage and monitor for climate change.

**Water Resources** are vulnerable to climate change. Some tools for the Forests to manage and monitor the effects of change are through water infrastructure (culverts) near waterways and associated floodplains and aquatic species and habitats. As part of a watershed vulnerability assessment (WVA), the Forest addressed these questions:

- What are the predicted changes in temperature, precipitation, runoff and extreme weather events over the next 30 to 50 years?
- Where are the sensitive areas of the Forests based on physical characteristics like geology, soil, slope and terrain?
- What past activities or land uses have stressed the ecological systems including the fragile and more sensitive aquatic resources?

The Assessment determined that the greatest risk to “water resources” from climate change on the GMUG, are those areas with certain “physical characteristics” or stressors that are affected by past /current land uses. Based on these factors, watersheds across the Forests were ranked and prioritized from the most “at risk” to the least.

The GMUG WVA report is included in, ["Assessing the Vulnerability of Watersheds to Climate Change: Results of National Forest Watershed Vulnerability Pilot Assessments"](#), and can be found online at: <http://www.fs.fed.us/ccrc/wva/PilotNFWatershedVulnerabilityReport.pdf> (PDF format; ~72MB))

### ***One avenue along the “management roadmap”***

How can we enhance the aquatic resources in vulnerable watersheds? One management action in anticipation of the effects of climate change is to evaluate the size of culverts and the anticipated change in stream flow/runoff that may occur. If a culvert is too small to pass large

flows that could be anticipated during extreme weather events (e.g. heavy storms, quick melting and flooding) then downstream aquatic habitats and resources could be damaged. With inadequately sized culverts, “blow outs” or culvert blockage would occur, affecting water quality and resulting in streambank erosion, stream channel undercutting and blockage of fish passage. About 153 culverts were inventoried on the GMUG for adequate flow size and to date six culverts have been replaced, with three more scheduled for replacement in the future.

### ***Partnerships – working together to share the science***

“Resiliency” is the ability of the forest or resource to adapt and/or recover after natural disturbances or in this case, natural events occurring in the context of climate change. Several groups are working together to evaluate the vulnerability of various plant and animal species to climate change effects and to perform work to enhance “resiliency” on forested lands. These groups are comprised of scientists from universities, land and water management agencies (federal, state and local) and other environmental organizations. Following are two efforts that incorporate management efforts, new science and monitoring to help create resiliency into the management of the Forests and to provide information for managing the effects of climate change over time:

### ***Uncompahgre Plateau Collaborative Forest Landscape Restoration Project (CFLRP)***

The CFLRP project on the GMUG National Forest builds on a 15-year history of collaborative efforts by many groups including federal and state land managers, counties, academia, conservation, forest and energy industry and public lands user groups.

The goal of this 10 year project is to enhance the resiliency of forested lands on the Uncompahgre Plateau. As a result of the lack of fire in the ecosystem and changes in naturally-occurring events on the plateau over time, the forests have changed and lost resiliency. Various management activities are being done to mimic and create more “natural patterns” of vegetation diversity (variety of tree species and ages). These activities include timber harvesting, mechanical treatments, prescribed burnings, trail and road relocation, riparian habitat restoration, invasive species control and eradication and re-vegetation with native plants. The outcome will be monitored over time and management practices may be adapted based on the results in other areas that have similar needs. The Forest Service will continue to work to improve the resiliency of the Uncompahgre Plateau landscape to better adapt to the effects of climate change.

<http://www.fs.fed.us/restoration/CFLRP/2010selections.shtml>

### ***Gunnison Basin Climate Change Working Group***

The GMUG is part of the Gunnison Basin Climate Working Group facilitated by The Nature Conservancy. This group recently compiled scientific information on local species and ecosystems and completed an assessment determining the vulnerability of 73 “species of

concern” in the Gunnison Basin (50 plants and 23 animals) and 24 ecosystems (17 terrestrial and 7 freshwater).

Gunnison sage-grouse is a focus for this working group. Riparian areas or native vegetation along rivers and streams are important habitat for this species. Through a Wildlife Conservation Society grant, several riparian areas on private land are being improved as a management demonstration project. These areas will be monitored to determine how they benefit the species and how they contribute to the resiliency of the species. Riparian habitat improvements will continue in the future with a few selected areas on the GMUG.

Information on the Working Group and documents can be viewed at:

<http://conserveonline.org/workspaces/gunnisonclimatechange/documents/all.html>)

The GMUG National Forest and its partners are applying climate smartness to our forest management. Our road map emphasized creating diverse and productive forests that will be resilient to natural occurring events. We are working to ensure that our forested lands will continue to benefit us and future generations.