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U.S. Forest Service R&D News: January 2021

News from the Washington Office and Research Stations

FEATURED STORY

Innovations in Studying Mangroves, Our Planet's Powerhouse Ecosystem

Mangrove forests are environmental superheroes, providing habitat for fish and wildlife, protecting coastal communities from high winds and storm surges, and storing more carbon than any other forested

ecosystem in the world. Yet their complex structure and often remote locations make them hard to study. A Forest Service scientist and partners are finding more efficient, low-cost ways to study the carbon mangroves store in their stems and roots and their ability to adapt to rapid sea level rise by applying terrestrial laser scanning (TLS) technology.

WILDLAND FIRE

Fire and Water: New Findings for Old Foes

While managed fire is a viable restoration approach in landscapes across the western U.S., its hydrologic impacts on watersheds are poorly understood. Forest Service researchers and partners evaluated the response of vegetation and soil moisture to 47 years of managed wildfire in the Sierra Nevada. They reported relatively little change in dominant vegetation and soil moisture, concluding the hydrologic benefits of managed fire in drier basins may be limited.

A New Approach for Selecting and Validating Burned Severity Indices

Burn severity indices are used to estimate and map ecological change across landscapes impacted by fire. Different indices may produce inconsistent results between forest types, making selecting the optimal index challenging. Forest Service scientists recently developed a method for cross-validating and selecting burn severity indices in the fire-prone New Jersey Pinelands National Reserve that can be used by managers and researchers.

SUSTAINABLE FOREST MANAGEMENT

A Deep Dive into Environmental Governance

In a special issue of the journal *Ecology and Society,* Forest Service guest editors explore how to better understand, recognize, and support local civic groups in environmental governance. The "Conceptualizing, Analyzing, and Supporting Stewardship: Examining the role of civil society in environmental governance" issue examines local stewardship across cultures, rural and urban landscapes, and scales.

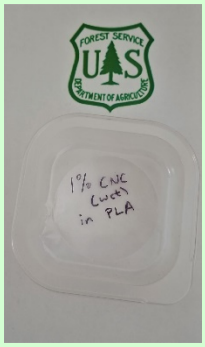
Peering into the Future: Exploring Drivers of Change in U.S. Forests and Forestry

A new Forest Service report provides insights on how future conditions will impact forestry and forests in the U.S. Eight drivers of change and the influence they may have were evaluated, including climate change, economic drivers, the forest products sector, technological change, demographics, society's changing forest values, the exercise of Indigenous rights, and forestry education.

Vegetation Counts in Urban Areas

In a recent study, Forest Service scientists and partners modeled the effects of urbanization on surface water across 81,000 different watersheds across the U.S. This was the first study examining water-urbanization dynamics in such detail at this scale. The findings underline the importance of the role of vegetation cover and green infrastructure in managing urban water runoff.

FOREST PRODUCTS



Eco-Plastic Pioneering

Forest Service materials engineers are helping to tackle one of today's most vexing challenges: plastic waste. Their research is breaking down barriers associated with producing the sustainable eco-plastic of the future. By combining bio-based and biodegradable polymers with cellulose nanocrystals, they are developing ways to produce a durable and commercially viable eco-friendly plastic.

Mapping Forest Fruits and Nuts

Fruit-producing shrubs like huckleberries, salal, Oregon grape, and beaked hazelnut are important in the Pacific Northwest for cultural history, tribal diets, local economies, and foraging wildlife and pollinators. To support monitoring, management, and restoration plans, Forest Service experts developed a story map with information on the ranges and timing of flowering and fruiting for many of these species.

CONSERVING WILDLIFE

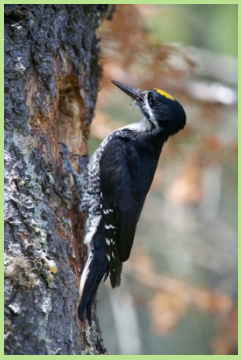
Spotted Owls, Wildfire, and Forest Restoration

Severe wildfires in the Western U.S. have destroyed many of the spotted owl's dense forest habitats. Forest Service scientists are working to help managers better understand what these changes mean for this iconic bird, including some of its endangered subspecies like the Mexican spotted owl.

The Salmon Fortune

Between 2007 and 2016, the Tongass and Chugach National Forests supported salmon harvests valued at more than $88 million annually, according to a Forest Service study. This comprised approximately 25 percent of all commercially caught salmon in Alaska, and 16 percent of the total monetary value of Alaska's salmon harvest.

DID YOU KNOW?



Woodpeckers are Ecosystem Engineers

Ecosystem engineers are organisms that significantly modify, maintain, or destroy a habitat. Cavity-excavating birds like woodpeckers serve this purpose by creating nesting spaces in live and dead trees which many small animals rely on and compete for.

SCIENTIST SPOTLIGHT

Congratulations to Forest Service research scientist **Dr. Constance "Connie" Millar**, a newly elected American Association for the Advancement of Science fellow. This honor is in recognition of her contributions to the fields of forest genetics and resource conservation, particularly science-based ecosystem management under climate change, and for creating lasting scientific networks.

Learn More!

The Forest Service Urban Forest Connections webinar series brings together experts to discuss the latest science, practice, and policy on urban forestry and the environment. The next webinar titled "Seeing the Landscape from the trees: An ecosystemic approach to urban forestry" is scheduled for January 13 at 1 p.m. EST.

The Forest Service's Rocky Mountain Research Station hosts a Science You Can Use webinar series, with one hour webinars held twice each month. They feature the latest research from its scientists covering a wide range of topics, including fire impacts, forest restoration, and wildlife management.

The newly launched Forest Service SCIENCEx webinar series brings together scientists and land management experts from across Forest Service research stations and beyond to explore the latest science and best practices for addressing large natural resource challenges across the country.

Tune in during National Invasive Species Week, February 22-26 at 3:30-4:30 p.m. EST, for daily webinars on a wide range of topics relating to invasive species management.

The Natural Inquirer is a free science education journal written for middle through high school age students. Check out the Hawaii- Pacific Islands issue which includes an article titled "Mangrove Mania" describing how sea-level rise and sedimentation affect mangrove forests.

Message from the Forest Service R&D Deputy Chief

Deputy Chief
Alexander L. Friend

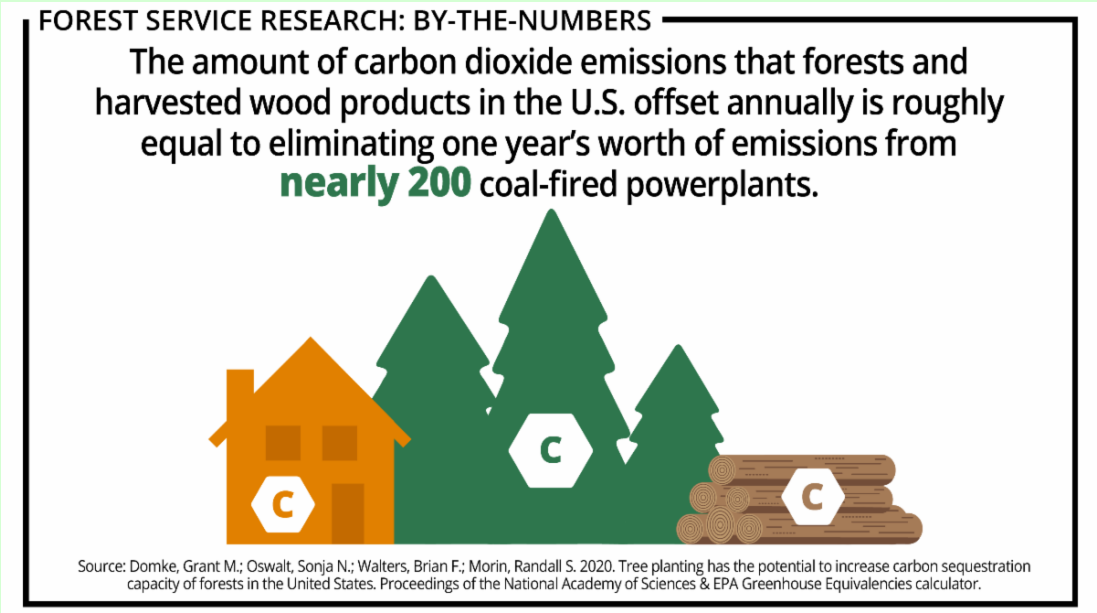
Showing Up to Challenge Climate Change

Climate change is a defining challenge of our era. Our forests and grasslands have the potential to play an outsized role in minimizing the impacts climate change has today and for future generations. Ensuring these vital natural resources can to do this hinges on land management and resource use decision-making based on sound science.

As an agency that engages in extensive research on the role our forests play in the climate equation, as well as the adaptive measures resource managers can take to build resilience against the impacts of climate change, the Forest Service is uniquely positioned to stand at the front line of these efforts.

The feature story of this month's newsletter highlights an example this work, demonstrating how Forest Service scientists are developing better, more efficient ways to study carbon-rich mangrove ecosystems.

JANUARY INFOGRAPHIC



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