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

News from the Washington Office and Research Stations

SPECIAL ISSUE ON INVASIVE SPECIES RESEARCH

FEATURED STORY

Managing Invasive Species in the 21st Century: A New Comprehensive Science Synthesis

Invasive species can be found in nearly every U.S. forest and grassland, often contributing to the decline

of native species and ecosystem health. A new open-access book, *Invasive Species in Forests and Rangelands of the United States*, compiles science and management strategies for invasive species across the country. Over 115 authors contributed to the book, including Forest Service scientists and managers, as well as partners from universities, tribes, and other non-governmental organizations. This publication covers early intervention strategies, management and restoration, inventory and monitoring, tools and technologies, impacts of invasive species, climate change effects, and social and societal aspects. Summaries detailing regional invasive species issues are also included.

PREVENTION & EARLY INTERVENTION

Partnering in Science to Responsibly Import Freshwater Fish

The Forest Service is supporting the U.S. Fish and Wildlife Service to block the import of potentially invasive and harmful freshwater fish species. In a recently published article, Forest Service scientists and partners proposed a decision-support analysis framework for assessing freshwater fish being considered for import.

Keeping Unwanted Hitchhikers Out

Wood packaging material coming in through U.S. ports of entry is a source of invasive wood-boring insects. A recent Forest Service study looked at which types of wood are most frequently infested and revealed associations among packaging woods, commodities, and shipment origins. This work can inform risk analyses for wood packaging materials to help reduce entry of non-native wood-boring insects.

Innovations in Invasive Freshwater Fish Removal with eDNA

Environmental DNA 'eDNA' sampling can be used to detect and manage invasive species. Forest Service scientists recently effectively applied it at all stages of a Brook Trout eradication program in small streams. They demonstrated eDNA sampling may help reduce the size and number of treatments, lower labor and cost, and limit the adverse effects on the native community. Photo Credit: Jay Fleming, U.S. Park Service.

MANAGEMENT & RESTORATION

A Geneticist's Take on Tackling the Emerald Ash Borer

The emerald ash borer is the most damaging invasive forest insect pest in North America, having killed hundreds of millions of ash trees across the U.S. since it was introduced. Finding and breeding emerald ash borer-resistant trees may be a key strategy in combatting this pest, and Forest Service research on this was recently featured in an article in *Science Magazine*.

Combatting Cheatgrass with Native Seed Mixes

Invasive cheatgrass in the southwestern United States threatens local ecosystems by altering fire patterns and out-competing native plants and

forage. Forest Service researchers have been studying how to combat cheatgrass using native seed mixes in post-fire restoration operations. When compared to conventional seed mixes, seed mixes that only included native species were most effective at keeping out cheatgrass in the long-term.

Using Drones for Targeted Biocontrol

The mile-a-minute weed is a highly invasive plant in the U.S. Although a specialist biocontrol agent has been identified, getting the tiny weevil (*Rhioncomimus latipes*) to remote areas in which the mile-a-minute weed has established itself is a challenge. Forest Service scientists and partners are now successfully using drones to detect mile-a-minute weed patches and release the weevil.

A One-Two Punch for Controlling Hemlock Woolly Adelgids

Hemlock woolly adelgids (HWA) are an invasive pest that feeds on the sap of eastern and Carolina hemlock trees. A new Forest Service guide presents a strategy for controlling HWA that integrates chemical and biological control measures, including introducing the *Laricobius nigrinus* beetle, which preys on HWA. This approach offers a more sustainable and holistic way to manage HWA impacts.

Unearthing More Reasons to Combat Scotch Broom in the Pacific Northwest

Managing Scotch broom is a priority for Douglas-fir plantations in the Pacific Northwest because it competes with seedlings for nutrients and water. Recent Forest Service research also shows this invasive shrub can alter the microenvironment in its favor, as well as for other nonnative species. This research has been integrated into forestry best management practices for Washington and Oregon.

RESOURCES AT YOUR FINGERTIPS

Invasive Species Science Updates from the Rocky Mountain Research Station

The Forest Service Rocky Mountain Research Station's Invasive Species Working Group publishes an annual newsletter showcasing its invasive species research activities and findings. The 2020 issue features topics including the impact of biocrust, dryland restoration, and research on the resistance of high-elevation pines to insects and pathogens. Email Justin B. Runyon to subscribe to the newsletter.

Forest Service Podcasts on Invasive Species

The Forest Service Northern Research Station's

podcast *Forestcast* explores how forests affect us and how we affect forests. The first season, 'Balance and Barriers', features invasive species. It includes six episodes in which scientists explore the latest research and impacts of gypsy moths, emerald ash borers, Asian longhorned beetles, and more.

The Natural Inquirer Explores Invasive Species

The Natural Inquirer is a free science education journal written for middle through high school age students. Check out the Invasive Species issue, along with games and other web resources. Young naturalists can also learn about STEM careers by exploring the Scientist Cards, which include Dr. Therese Poland, an entomologist and editor of the new invasive species science synthesis book described in the feature story.

DID YOU KNOW?

Invasive species cause an estimated $120 billion per year in economic damage in the U.S.

Invasive species impact every major region of the U.S., altering composition, structure and function of native insects, and can impact human health.

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 "Extreme Events in the Urban Forest: Assessment, Response, and Recovery" is scheduled for February 10 at 1 p.m. EST.

The Forest Service Rocky Mountain Research Station Science You Can Use webinar series offers several webinars each month. February topics include using Forest Inventory and Analysis data for forest planning and monitoring, post-wildfire erosion control, and post-fire tree regeneration in ponderosa pine forests.

The Forest Service Biochar Webinar Series showcases biochar applications and its environmental benefits. The next webinar titled "Forest Management for Increasing Carbon Sequestration with Biochar" is scheduled for February 18 at 11 a.m. EST.

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 p.m. EST, for *SCIENCE x Invasive Species.* Daily webinars will feature a wide range of topics relating to invasive species management, including invasive tree pests and pathogens, aquatics, animals, and plants.

Message from the Forest Service R&D Deputy Chief

Deputy Chief
Alexander L. Friend

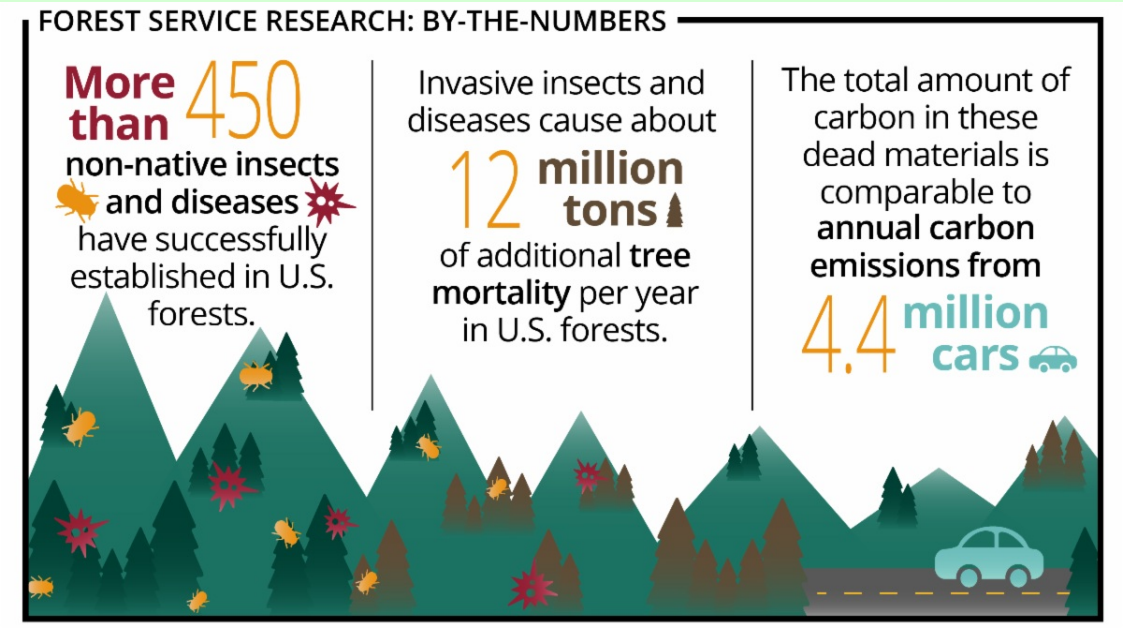
The Invasive Species Can of Worms

Over twenty years ago, the larvae of some iridescent green beetles made it into wooden shipping crates destined for a U.S. port. They emerged into a new world in which the ash trees that the beetle's hungry larvae feed on have no natural defenses. Fast forward just a couple decades, and the emerald ash borer has killed tens of millions of trees across the U.S., even endangering entire ash species.

This is just one example that characterizes the monumental challenge hundreds of invasive species pose for our national forests and grasslands. The task of detecting new alien species coming in through our brimming ports, and managing the impacts of already introduced invasive pests and diseases, is one that requires an all-hands-on-deck approach.

As showcased in this month's newsletter, the Forest Service is a leading agency in this effort. Across the country, our scientists and experts work to provide land managers and others better information, applications, and tools for understanding, preventing, and managing biological invasions and mitigating the impacts of invasive species on our national forests and grasslands.

FEBRUARY INFOGRAPHIC



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