



# 2014 Report on the Health of Colorado's Forests

*Urban and Community Forests: An Investment in Colorado*

# Acknowledgments

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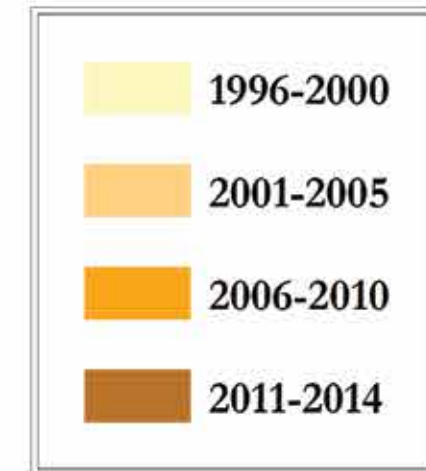
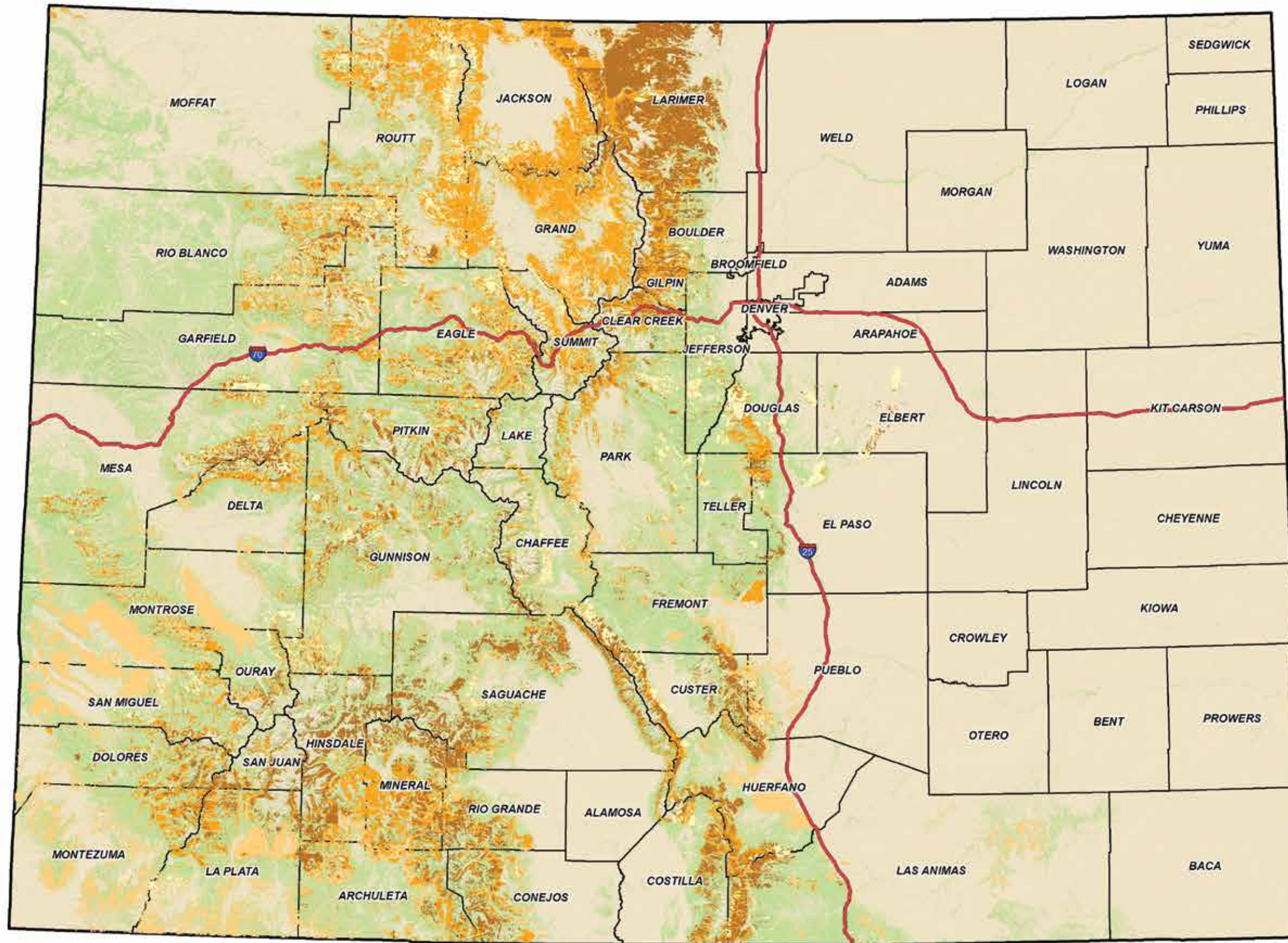
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**Front cover photo:** Autumn on the Colorado State University campus. Photo: Bill Cotton, Colorado State University

**Background photo this page:** Boulder's Pearl Street Mall. Photo: Bill Cotton, Colorado State University

# Forest Insect and Disease Progression in Colorado, 1996-2014



## Aerial Survey Data

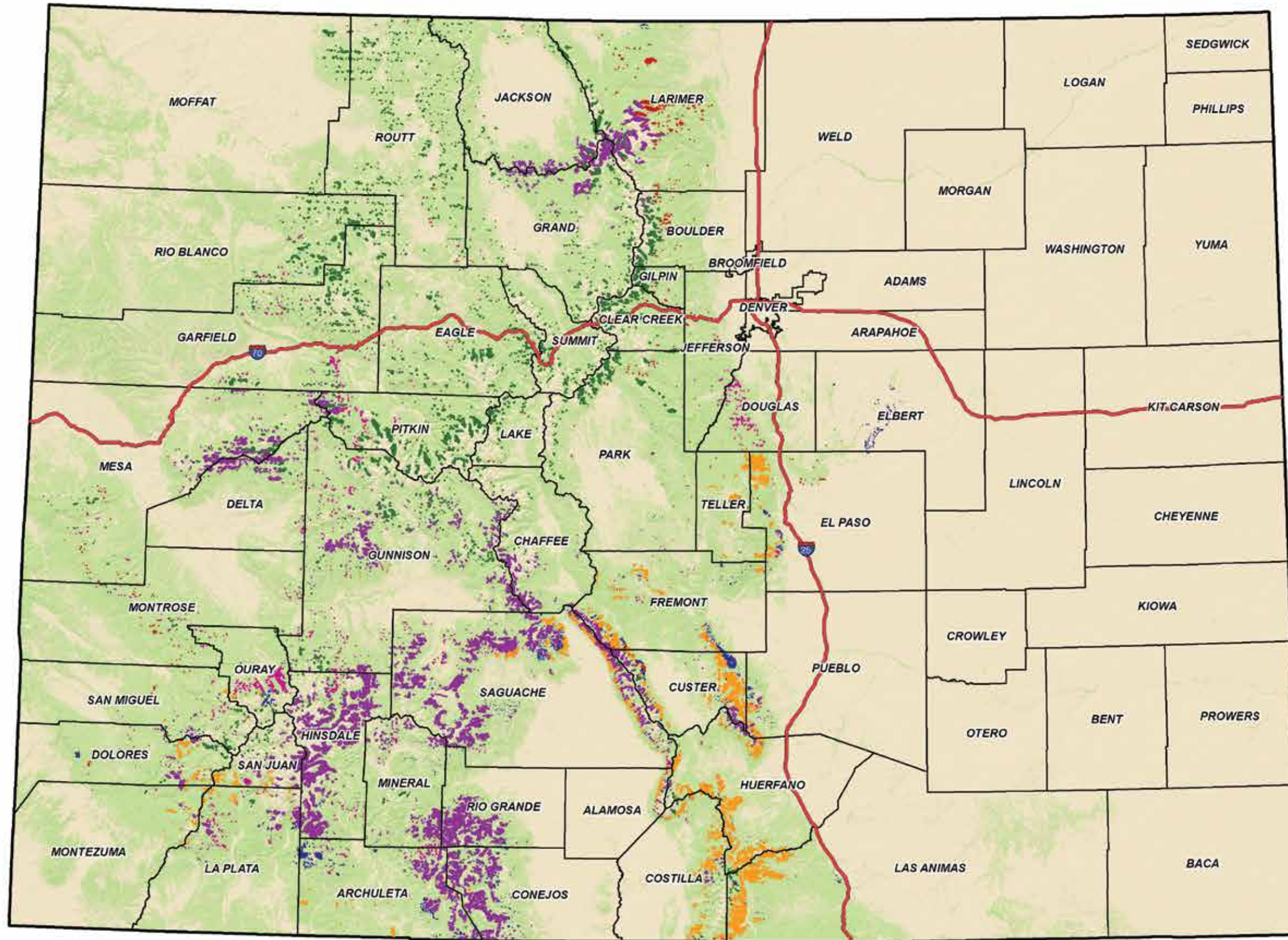
Due to the nature of aerial surveys, the data on this map only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented on the map because these agents are not detectable from aerial surveys. The data presented on this map should only be used as an indicator of insect and disease activity, and should be validated on the ground for actual location and causal agent. Shaded areas show locations where tree mortality or defoliation were apparent from the air. Intensity of damage is variable, and not all trees in shaded areas are dead or defoliated.







The insect and disease data represented on this map are available digitally from the USDA Forest Service, Region 2 Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using this map for purposes other than those for which it was intended may yield inaccurate or misleading results.

Map created December 2014  
 For more information:  
[www.csfs.colostate.edu](http://www.csfs.colostate.edu)  
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# 2014 Insect and Disease Activity in Colorado Forests



	<b>Spruce Beetle</b> 485,000 Acres
	<b>Western Spruce Budworm</b> 178,000 Acres
	<b>Subalpine Fir Decline</b> 173,000 Acres
	<b>Douglas-fir Beetle</b> 34,000 Acres
	<b>Mountain Pine Beetle</b> 15,000 Acres
	<b>Other Insects and Diseases</b> 12,900 Acres

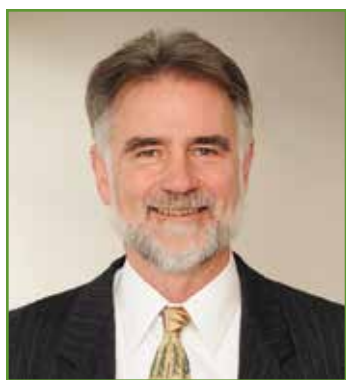
## Aerial Survey Data

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▲ Michael B. Lester, State Forester and Director. Photo: Society of American Foresters

## Director’s Message

January 2015

The objective of the annual Report on the Health of Colorado’s Forests is to inform state legislators, citizens and other stakeholders about the condition of our forests, to provide a basis for public dialogue. Each year, the report provides a broad update on forest insect and disease activity throughout the state. This year’s report also focuses on the importance of our urban and community forests, challenges we face in managing them, and the actions we can take to address those issues. We chose this emphasis to highlight the contributions that our urban and community forests make to quality of life, and to underscore the importance of proper care for forests at risk to insects, diseases and challenging environmental conditions.

Trees provide numerous benefits, whether growing in our mountain forests or in urban settings. The former provide benefits such as clean water, wildlife habitat, recreation and economic benefits. Equally important are the benefits of urban trees, which help clean our air, provide shade, control storm runoff and contribute to quality of life. They are one of the few components of a community’s infrastructure that actually increase in value over time.

Not long after I became Colorado’s State Forester in 2013, an urban tree pest I had come to know in Pennsylvania – emerald ash

borer – was confirmed in Colorado for the first time. This destructive insect, which has cost Eastern communities billions of dollars to manage, provides a prime example of why it’s important we devote significant resources to caring for our urban and community trees.

Successful management of our forests can only be accomplished through partnerships. As a part of the Warner College of Natural Resources at Colorado State University and working closely with the Colorado Department of Natural Resources, the Colorado State Forest Service relies on numerous other partners, many of whom are named in this report, to achieve healthy forests across the state.

I hope you find the information covered in this year’s report useful and interesting. Please feel free to contact any Colorado State Forest Service office to learn more about our diverse forests – in both community and wildland settings – and what you can do to help manage them for the benefit of present and future generations.

Michael B. Lester  
State Forester and Director  
Colorado State Forest Service

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## Executive Summary

The Colorado State Forest Service (CSFS) produces an annual report on the health of Colorado's forests, which provides information to the Colorado General Assembly and citizens of our state about emerging and ongoing forest health issues, and actions being taken to address them. The theme of the 2014 report is *Urban and Community Forests: An Investment in Colorado*. After an overview of the condition of Colorado's forests and insect and disease concerns around the state, this year's report features content devoted to our urban and community forests.

As in previous years, insect and disease data for this report were largely obtained through the annual aerial forest health survey, a cooperative project between the CSFS and the Rocky Mountain Region of the USDA Forest Service. Data also were derived from field inspections, contacts with forest landowners

and special surveys designed to ensure early detection of invasive insect species.

For the third straight year, spruce beetle was the most widespread insect pest of Colorado's forests, impacting 485,000 acres of Engelmann spruce forest in 2014. In contrast, the area affected by mountain pine beetle declined to its lowest level since the current outbreak began in 1996. Other insect and disease concerns in Colorado's mountain forests include Douglas-fir beetle, subalpine fir decline, western spruce budworm and defoliating insects of aspen. A more comprehensive list of the damaging agents of Colorado's forests is available in the supplemental *2014 Colorado Forest Insect and Disease Update*, available online at [www.csfs.colostate.edu](http://www.csfs.colostate.edu).

Forest health also is an issue in our urban and community forests. In Colorado's community forests, primary insect and disease

◀ Every urban tree returns two-and-a-half times the total investment through higher property values, reduced air and water pollution and energy savings. Photo: Bill Cotton, Colorado State University

concerns are thousand cankers disease, which has been killing black walnut trees in Front Range urban forests for a decade and has now spread to the Eastern Plains, and the highly destructive emerald ash borer (EAB). This pest, which infests all true ash species, was first confirmed in Colorado in 2013, in the City of Boulder. An interagency Colorado EAB Response Team has taken various actions to manage its spread in Colorado, including: establishing a quarantine for Boulder County and surrounding areas; implementing a monitoring/detection process to determine the extent of infestation; conducting outreach efforts on the importance of not moving ash wood; and introducing biocontrol measures to help manage EAB's potential spread. Additional EAB surveys did not detect infestations outside the City of Boulder in 2014, but the pest poses a serious threat to Colorado's urban forests, where ash trees comprise an estimated 15 percent or more of all trees.

Caring for Colorado's urban and community forests – and protecting them from threats like EAB – is vital to preserving their myriad benefits. Planted trees in populated areas, from small towns to larger cities like Denver and Grand Junction, provide countless ecological and economic benefits that directly impact the majority of Coloradans. Each urban tree returns two-and-a-half times the financial investment to plant and maintain it, through higher property values, reduced air and water pollution, and energy savings. For decades, urban trees continually work to capture and store carbon, remove pollutants from the air, reduce stormwater management costs, and provide a more pleasant atmosphere where families live and work.

In Colorado's semi-arid climate, and with the presence of destructive insects and diseases, maintaining healthy urban and community forests presents considerable challenges. Trees on Colorado's Eastern Plains,

which have been planted over generations to modify the harsh, windy environment, face perhaps even greater challenges – and arguably reap greater benefits. On the plains, trees serve some of the same functions as in larger towns, and also form windbreaks, living snow fences and shelterbelts that protect livestock, crops, roads, homesteads and other property from wind and snow.

From urban settings to plains communities and mountain forestlands, the CSFS is the lead state agency for providing technical forestry assistance to help private landowners and communities achieve their stewardship goals. As part of this role, the agency offers communities throughout the state technical assistance for urban tree planting, planning, care and maintenance needs. The CSFS also works with private landowners to share best practices for achieving healthy urban trees, through workshops, site visits and publications, and through coordination of the Tree City USA® program in Colorado.

Urban and community forestry encompasses the broad stewardship and management of natural resources, having impacts on not just planted trees, but everything from urban wildlife to air and water quality. Foresters working for municipal, county and state government and for higher education organizations help create healthier, more livable urban environments through active management of community trees. Some of the many public needs addressed by urban and community forestry include planning and planting our next-generation urban forests; invasive species planning and response; tree inventory and assessment; education and outreach; and urban wood utilization.

Tree species diversity is critical for the long-term health of our urban and community forests. Whenever too many trees of the same species (or genus, in some cases) are planted in one area, the odds increase for losing a larger

percentage of trees susceptible to diseases or insects when a pest outbreak occurs.

Like the need for tree species diversity, diverse partnerships are critical to addressing forestry challenges in Colorado, and pooling of resources allows for more effective and efficient management. Prominent community forestry partnerships in Colorado include the interagency EAB Response Team, Colorado Tree Coalition and South Platte River Urban Waters Partnership. Also, work to remove invasive trees at Barr Lake State Park provides a good example of collaborative efforts to achieve forestry objectives in Colorado.

Forestry challenges do not stop at property lines, and we all play a role when it comes to addressing forest health. Successful forest management in the mountains, on the plains and in urban or community settings can only be accomplished through the collaborative efforts of various stakeholders – including government agencies, private landowners, tree-care companies and non-profits. We all share responsibility to help restore and enhance our diverse forests, because an investment in our trees is an investment for all of Colorado.



▲ Ensuring a variety of tree species is important to reduce the potential impacts of future insect and disease threats. Photo: Bill Cotton, Colorado State University



### **Colorado State Forest Service: Facilitating Forest Stewardship on Private Land**

The Colorado State Forest Service (CSFS) is the lead state agency for providing technical forestry assistance and wildfire mitigation expertise to private landowners. A service and outreach agency of the Warner College of Natural Resources at Colorado State University, the agency has approximately 130 full-time and seasonal employees, and 19 field offices across the state. The CSFS also provides staffing to the Division of Forestry in the Colorado Department of Natural Resources.

The CSFS works with private landowners, communities, and other agencies and organizations to help them make informed decisions to achieve their stewardship goals, reduce wildfire risk, and promote healthy and diverse forests for present and future generations. Every year, the CSFS helps treat approximately 20,000 acres of forestland, and assists approximately 6,400 landowners and hundreds of communities to help improve forest health.



▲ Top: Aaron Rector, CSFS Cañon City District assistant district forester, measures the diameter of a ponderosa pine. Photo: Kathryn Hardgrave, CSFS

▲ Above: Meg Halford, CSFS Franktown District assistant district forester, talks with landowners about the results of an aerial survey to map pine sawfly defoliation. Photo: William M. Ciesla

***The mission of the Colorado State Forest Service is to achieve stewardship of Colorado's diverse forest environments for the benefit of present and future generations.***



## Statewide Insect and Disease Update

The following sections summarize the status of insect and disease damage in Colorado's forests during 2014. The primary source of these data is the annual aerial forest health survey, a cooperative effort between the Colorado State Forest Service and the Rocky Mountain Region of the USDA Forest Service. The annual survey is an effort at mapping active insect and disease damage that can be detected by aerial observers; acres referenced from the 2014 survey do not include cumulative damage from previous years. Other sources of information for this update are field visits and other contacts with forest landowners, and data from the Forest Inventory and Analysis (FIA) program. In addition, the results of special detection surveys for emerald ash borer, gypsy moth and thousand cankers disease were utilized. A more comprehensive list of the damaging agents of Colorado's forests is available in the supplemental 2014 *Colorado Forest Insect and Disease Update*, available online at [www.csfs.colostate.edu](http://www.csfs.colostate.edu).

### Conifer Forests

#### Spruce Beetle

(*Dendroctonus rufipennis*)

Spruce beetle outbreaks continued across Colorado's high-elevation Engelmann spruce forests in 2014. This was the state's most widespread forest pest for the third successive year, with active infestations occurring on 485,000 acres – an increase of approximately 87,000 acres over 2013. Outbreaks continued in the San Juan/La Garita ranges, Grand Mesa, the Wet Mountains and portions of northern Colorado. Infestations increased in severity in the Cochetopa Hills and Sangre de Cristo Range in the southwest part of the state, to the north and east of the largest ongoing outbreak. In some areas, most or all of the mature spruce trees have been killed. Nearly 1.4 million acres of mature spruce have been impacted in Colorado since 1996.

#### Mountain Pine Beetle

(*Dendroctonus ponderosae*)

In 2014, the area affected by mountain pine beetle declined to its lowest level since the current outbreak began in 1996. A total of 15,000 acres with some level of active infestation were mapped during the annual

aerial forest health survey, and most of the active infestation (approximately 10,000 acres) occurred in Larimer County. Infestations also continued along the eastern slope of the Sangre de Cristo Range and on Miller Mesa near Ridgway. The decline in areas with

active infestation is largely due to the death of suitable host trees during previous years of the outbreak. Since 1996, approximately 3.4 million acres of lodgepole, ponderosa and five-needle pines have been impacted by the outbreak in Colorado.

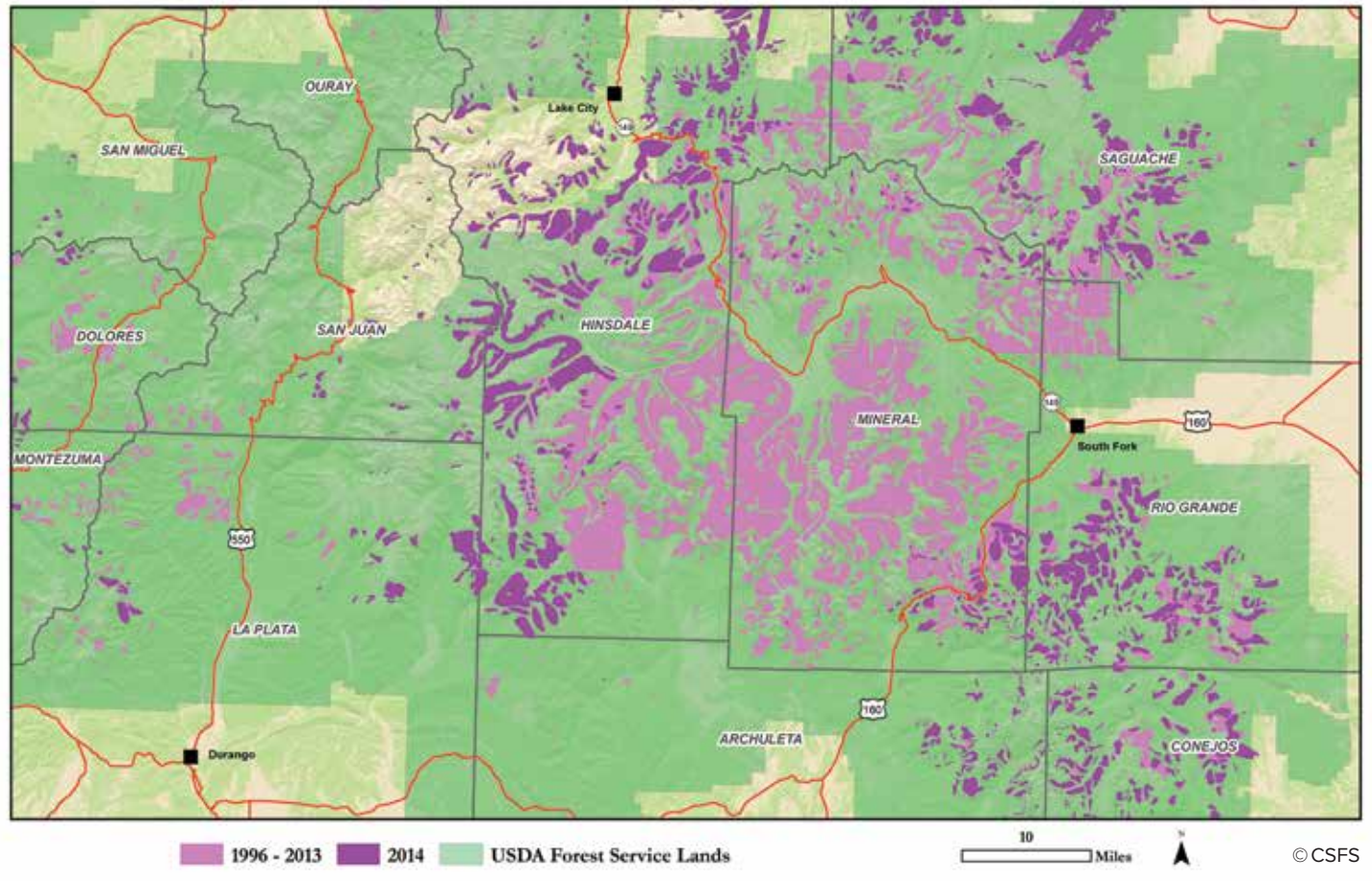


▲ **Before:** This Engelmann spruce forest, located in Slumgullion Pass near Lake City, was healthy and vigorous in 2006. Photo: William M. Ciesla



▲ **After:** By 2014, most of the trees have been killed by spruce beetle in the same Engelmann spruce forest. Photo: William M. Ciesla

### Spruce Beetle in Southwestern Colorado, 1996-2014



▲ Spruce beetle outbreaks occurred in many areas of Colorado, but the southwestern region is experiencing the largest ongoing outbreak in the state.



▲ An adult spruce beetle on the bark of an Engelmann spruce tree. Photo: William M. Ciesla



▲ Trees in the Weminuche Wilderness heavily infested with spruce beetles. Fire-scarred trees in the foreground are the result of the West Fork Fire Complex of 2013. Photo: William M. Ciesla

## Subalpine Fir Decline

Tree mortality of subalpine fir, caused by a combination of root disease fungi (most commonly *Armillaria* spp. and *Heterobasidion parviporum*) and western balsam bark beetle (*Dryocoetes confusus*) continued at chronic levels during 2014. Approximately 173,000 acres of tree mortality were mapped, compared with 178,000 acres in 2013.

## Douglas-fir Beetle

(*Dendroctonus pseudotsugae*)

Douglas-fir beetle continued to kill groups of mature Douglas-fir trees in several areas of the state, and tree mortality attributed to the beetle was mapped on 34,000 acres. The heaviest damage occurred between Ouray and Ridgway and in the northern portions of the Rampart Range, in Douglas County.

## Fir Engraver Beetle

(*Scolytus ventralis*)

Fir engraver beetle is a pest of true firs (white fir, subalpine fir) throughout the West; in southern Colorado, white fir is the preferred host. In 2014, infestations occurred on 43,000 acres, with areas of significant damage detected on the eastern slopes of the Sangre de Cristo and Wet Mountain ranges and in and around the community of Ouray.



▲ Mortality from subalpine fir decline was noticeable throughout the Elk Mountains between McClure and Independent passes. Photo: William M. Ciesla



▲ An outbreak of fir engraver beetle erupted into moderate to severe levels in white fir stands outside of Ouray, Colo. Photo: William M. Ciesla

## Western Spruce Budworm

(*Choristoneura freemani* [= *occidentalis*])

The larval stage of western spruce budworm damages buds and current-year foliage of Douglas-fir, true firs and spruce. Outbreaks have been underway across portions of southern Colorado since 1998, and in 2014 a total of 178,000 acres of aerially visible defoliation were mapped – an increase from 156,000 acres in 2013. Infestations have gradually spread northward, and the area of aerially visible defoliation in the southern Rampart Range has increased significantly.



▲ Western spruce budworm larvae feed on buds and current-year foliage of Douglas-firs, true firs and spruce trees. Photo: William M. Ciesla

## Douglas-fir Tussock Moth

(*Orgyia pseudotsugata*)

Douglas-fir tussock moth defoliates Douglas-firs and true firs. Outbreaks are cyclic in nature and occur at seven- to 10-year intervals. The last outbreak in Colorado occurred from 2004 to 2008 near Aspen Park and in the northern Rampart Range. Defoliation by Douglas-fir tussock moth over multiple years can cause mortality in impacted trees.

In 2014, areas of severe defoliation by this moth were detected on the slopes of Cheyenne Mountain south of Colorado Springs and in the northern Rampart Range. In all, 530 acres of aerially visible defoliation were mapped. In addition, localized defoliation of Colorado blue spruce occurred in urban areas in Colorado Springs, Denver, Boulder and Fort Collins.



▲ A pupal case and an adult male Douglas-fir tussock moth. Adult moths emerge from cocoons from late July through November. Photo: William M. Ciesla



▲ Pine sawfly larvae populations were so high in Elbert and El Paso counties in 2014 that they stripped host trees of foliage long before their feeding cycle was completed. Photo: William M. Ciesla

### Pine Sawfly

(*Neodiprion autumnalis*)

The pine sawfly, which as larvae defoliate ponderosa pines, has been present at low to moderate levels in portions of Elbert and El Paso counties, along the easternmost fringes of Colorado's ponderosa pine forests, for many years. However, its population surged into a major outbreak in 2014, causing almost complete consumption of the foliage over large areas of pine forests in these counties. A total of 7,400 acres of defoliation was mapped during the aerial forest health survey.

## Deciduous Forests

### Defoliating Insects of Aspen

Western tent caterpillar (*Malacosoma californicum*) and large aspen tortrix (*Choristoneura conflictana*) defoliate aspen forests, and both species have caused defoliation of aspen forests in southern Colorado since 2004. In 2014, 78,000 acres of aerially visible defoliation were mapped, compared with 54,000 acres in 2013. Notably heavy damage caused by western tent caterpillar occurred from Poncha Pass south and west to the historic mining town of Bonanza.

### Thousand Cankers Disease

Thousand cankers disease (TCD), caused by a fungus (*Geosmithia morbida*) and spread from tree to tree by the walnut twig beetle (*Pityophthorus juglandis*), has been killing black walnut trees in Colorado's urban forests for the past decade. Decline and death of ornamental black walnuts continued in urban areas from

Cañon City north to Fort Collins in 2014. Also, a cooperative survey conducted by the CSFS, Colorado State University Extension, the CSU Plant Diagnostics Clinic and the City of Fort Morgan led to the detection of this disease in Fort Morgan – the easternmost location where TCD has been found in Colorado.

### Emerald Ash Borer

(*Agrilus planipennis*)

Emerald ash borer (EAB) is an exotic pest that became established in the U.S. in the late 1990s and now has spread to 24 states and two Canadian provinces, killing millions of ash trees. Only ash trees are at risk from EAB – but all species of true ash (*Fraxinus spp.*) are at risk.

In September 2013, an EAB infestation was first confirmed in Colorado in the City of Boulder. An interagency EAB Response Team began a preliminary delimitation survey that failed to determine the extent of infestation and established a quarantine that now encompasses Boulder County and some surrounding areas.

Early in 2014, the initial delimitation survey was completed and indicated that the known area of EAB infestation was confined to the City of Boulder. Additional surveys in the Metro Denver area and other communities along the Front Range did not detect new infestations in 2014, but monitoring efforts revealed clear evidence of the pest in additional areas of the City of Boulder.



▲ This black walnut tree, beside a Fort Collins home, is infested with thousand cankers disease. Photo: William M. Ciesla

## The Importance of Plains Forestry in Colorado



▲ A healthy riparian ecosystem composed of plains cottonwoods, willow species and other broadleaf trees along Chacuaco Creek. Photo: Shelly Simmons, CSFS



▲ District Forester Donna Davis, CSFS La Junta District, teaches Colorado Master Volunteer Forest Stewards how to identify, care for and manage trees in plains communities. Photo: Jamie Dahl, CSFS

Except for the trees naturally occurring in piñon-juniper forests and riparian areas, those on Colorado's Eastern Plains have been planted over generations to modify the harsh, windy environment and make it more suitable for humans, livestock and crop production.

Some of the primary functions of planted trees on the Eastern Plains, in both community and agricultural settings, include:

- creating windbreaks and shelterbelts that enhance water conservation; protect livestock, crops, roads, homesteads and other property from wind and snow; help fight soil erosion; and provide opportunities for economic savings
- offering shade and energy savings through reduced heating/air-conditioning costs in small towns and rural homes
- forming living snow fences that keep roadways accessible
- creating wildlife habitat
- enhancing quality of life for communities, rural landowners and homeowners with trees that offer aesthetic appeal, visual screens, reduced noise and airborne dust mitigation

Practicing forestry in eastern Colorado can be difficult due to the broad geographic scope of a largely treeless landscape, and the budget constraints of many smaller municipalities that lack dedicated forestry staff or the funding necessary to plant and maintain trees. To fill this void, the Colorado State Forest Service helps rural landowners and smaller communities with tree selection, planting and care advice; insect and disease concerns; management of invasive species in riparian settings; development and support for local tree boards; and outreach, service and education. Also, for more than 50 years the CSFS Nursery in Fort Collins has been a reliable source of tree and shrub seedlings for conservation plantings.

Trained local volunteers provide another means to address tree concerns across the Eastern Plains. In the spring of 2014, the CSFS and Colorado Tree Coalition offered the first-ever "Colorado Master Volunteer Forest Steward – Plains" course in La Junta. Nineteen students graduated from the 36-hour, six-week training, held at Otero Junior College and the CSFS La Junta District office. Coursework provided participants with key concepts of individual tree care and knowledge and appreciation of community trees on the plains, enabling them to serve as forestry advocates to widespread plains communities.

## Our Community Forests: Benefits and Challenges

Planted trees in populated areas, from small towns to the largest cities, not only beautify these communities, but also provide countless ecological and economic benefits. Trees are one of the few components of a community's infrastructure that increase in value over time. Trees attract people, which in turn attract businesses and create tax dollars. They are perhaps the least expensive and most rewarding infrastructure investment a community can make.

Maintaining Colorado's urban and community forests and protecting them from threats is vital to preserving their myriad benefits for its citizens. But in Colorado's semi-arid climate, and with the presence of destructive insects and diseases, maintaining healthy urban and community forests presents considerable challenges.

### The Benefits of Urban and Community Forests

After planting and maintenance costs are figured in, each urban tree returns two-and-a-half times the total investment through higher property values, reduced air and water pollution, and energy savings. For decades, they continually work to capture and store



▲ Urban trees help with stormwater management. Trees uptake water, which can prevent or minimize flooding and stabilize river banks. Photo: Bill Cotton, Colorado State University

carbon, remove pollutants from the air, reduce stormwater management costs, and provide a more pleasant atmosphere where families live and work.

Benefits of urban and community trees include:

- improved stormwater management

- improved air quality
- higher property values
- lower building cooling costs
- increased carbon dioxide sequestration
- reduced ambient noise
- enhanced wildlife habitat
- added aesthetic appeal



▲ Diana Selby, assistant district forester for the CSFS Fort Collins District, teaches Colorado State University students how to enter tree inventory data into a GPS unit. Photo: Jamie Dahl, CSFS

Unlike in urban areas in the eastern U.S., tree canopy cover in Colorado generally decreases farther away from populated areas (with the exception being towns located in dense mountain forests). This is because most trees here have been planted, rather than occurring naturally. As a result, pollutant uptake rates by roots are often higher in residential areas than in natural or unmanaged lands. Trees growing near waterways in urban settings also play a significant role in intercepting and absorbing rainfall, which mitigates flood concerns during heavy storms.

### Challenges to Achieving Healthy Community Forests

Trees growing in Colorado's cities and towns, whether in large public parks or in small residential backyards, face considerable challenges. Most notably, many of the trees planted in Colorado's urban settings are not

native to this region, and thus struggle to thrive in the state's semi-arid climate, broad temperature fluctuations and potentially poor soils without regular care. Severe windstorms and snowstorms that occur in the spring and fall – when leaves are present on deciduous trees – cause additional damage and destruction to community and private trees. Also, new developments and construction present a threat to established trees.

Non-native insect and disease threats are another major challenge facing our community forests. Emerald ash borer (EAB) poses a serious threat to Colorado's urban forests, where ash species comprise an estimated 15 percent or more of all trees.

Besides EAB, our urban forests face other significant insect and disease threats. Thousand cankers disease of black walnut is fully entrenched in Colorado, and has already

killed thousands of trees in portions of the Metro Denver area and many other cities along the Front Range and Eastern Plains. Gypsy moth, though not established in Colorado, is a potential threat to many species of deciduous and conifer trees. These and other threats to the state's urban forests have the potential to result in substantial costs, both economic and environmental.

## The Value of Metro Denver's Urban Forests

The Denver area attracts many people as an ideal place to live, work and visit, leading to increasingly dense populations in urban environments. Despite the obvious needs for additional housing and infrastructure, green space remains critical to quality of life for residents here. Approximately 10.7 million trees can be found in Metro Denver's urban forests, utilized for everything from shade in recreational locations to helping control excess water flows during intense storm events.

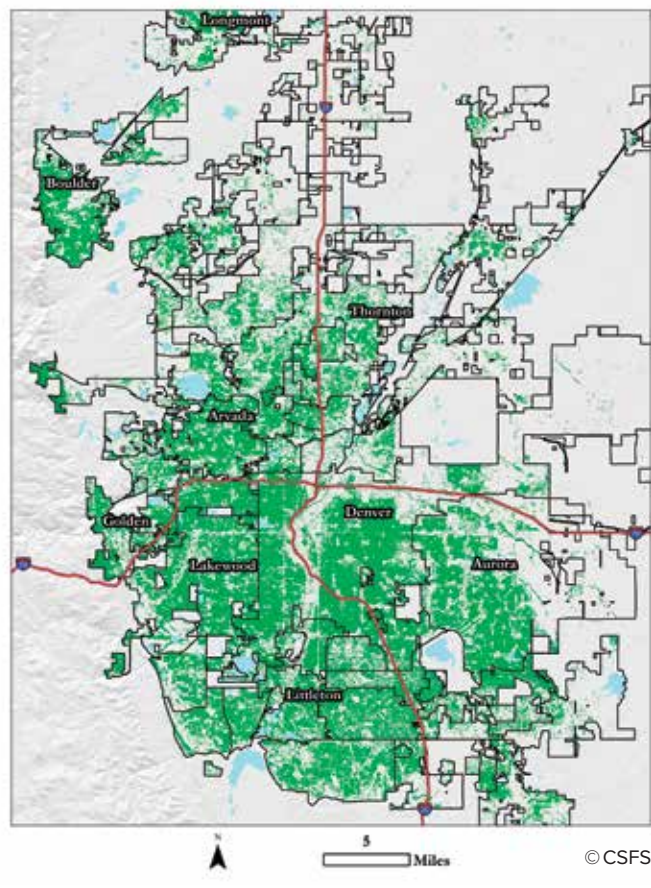
Metro Denver's urban tree canopy covers 16 percent of the land area, ranging to as high as 37 percent in some communities. Impervious surfaces like roads, parking lots and buildings that do not absorb precipitation and runoff account for approximately 34 percent of the land area, while lawns, other vegetation and bare soil account for 48 percent.

The collective urban forests of the Metro Denver area yield significant monetary benefits. The region's 72,272 acres of forest canopy produce services valued at \$551 million annually, with the largest benefit being in the form of property value increases.



▲ Approximately 10.7 million trees can be found in Metro Denver's urban forests. Photo: Bill Cotton, Colorado State University

### Metro Denver Urban Tree Canopy Cover



▲ Metro Denver's urban tree canopy covers 16 percent of the land area, ranging to as high as 37 percent in some communities. (Data Source: National Land Cover Database 2011)

## Urban and Community Forestry: The Role of the Colorado State Forest Service

The Colorado State Forest Service offers communities throughout the state technical assistance for urban tree planning, planting, care and maintenance needs. The agency also works with private landowners to provide education about best practices for achieving healthy urban trees through workshops, site visits and publications.

The CSFS urban and community forestry program is primarily funded with federal dollars, through the USDA Forest Service's State and Private Forestry program. Colorado communities address many of their own urban forestry needs with funding provided by the nonprofit Colorado Tree Coalition. This funding is largely generated through private foundation grants, gifts and endowments.

Specific community forestry programs and projects in which the CSFS is actively involved include:

### Tree Inventories and Management Plans

The CSFS helps communities decide which type of tree inventory is best suited for their needs and provides survey options to meet those needs. The agency also offers comprehensive tree resource management planning to allow communities to maintain and add to tree resources. Arborists working with the CSFS in 2013 and 2014 randomly sampled community trees throughout the state to complement existing tree inventory data and fill in gaps necessary for community foresters to make informed management decisions.

### Invasive Species Planning and Response

Strategies to cope with the introduction and spread of invasive species in our urban and community forests need to be identified and implemented prior to their establishment. The CSFS works with partner agencies to address emerging and existing diseases and pests in

Colorado, such as emerald ash borer (EAB) and thousand cankers disease (TCD).

### Tree City USA®

In Colorado, the CSFS coordinates the Tree City USA® program, sponsored by the Arbor Day Foundation (ADF) in cooperation with the USDA Forest Service and the National Association of State Foresters. To receive Tree City USA® recognition, a community is required to have a tree board or city department responsible for trees; a tree care ordinance in place; a community forestry program with an annual budget of at least \$2 per capita; and an Arbor Day observance event and proclamation. The program provides direction, technical assistance, public attention and national recognition for urban and community forestry programs in thousands of towns and cities that more than 135 million

Americans call home. The many benefits of being a Tree City include creating a framework for action, education, a positive public image and citizen pride. Currently, Colorado has 92 Tree City USA® communities.

### Tree Campus USA®

The Tree Campus USA® program recognizes college and university campuses that effectively manage their campus trees, and engage students and the surrounding communities in campus-based service learning opportunities and community forestry efforts. To achieve this designation, educational institutions must meet five standards developed to promote healthy trees and increase student involvement. Like Tree City USA®, this program is sponsored by the ADF and administered by the CSFS. Currently, five Colorado universities have Tree Campus USA® recognition.



▲ Keith Wood, CSFS community forestry program manager, leads a workshop for homeowners on how to properly prune trees. Photo: CSFS



## Planting Trees and the 10 Percent Rule

Although it makes sense to plant tree species that have thrived in a particular urban or community setting, it's a bad idea to focus too much on any one tree type. Whenever too many trees of the same species (or even closely related species) are planted in one area, the odds increase for losing a high percentage of susceptible trees to unforeseeable future attacks by insects and diseases. A good example in Colorado is ash trees and their susceptibility to emerald ash borer (EAB).

For decades, millions of green and white ash varieties were planted in Colorado's public parks and street rights-of-way, new community developments and private lots due to their fast growth, ability to tolerate urban growing conditions and high aesthetic value. The trees thrived, encouraging even more ash plantings and nurseries seeking to meet this demand. Now an estimated 15 percent or more of all trees in Colorado communities are ash. This has become a serious concern with EAB – a pest that attacks and kills all true ash trees – confirmed in the state.

Species diversity is an important element in the long-term health of urban forests. As a general rule of thumb, no one tree species should comprise more than 10 percent of all planted trees in any urban or community setting. Take a look at what's successfully growing on your own lot and in the surrounding neighborhood, and try to plant a diverse arrangement of similar tree species. Future insect and disease threats are less likely to spread naturally in areas with more species diversity, due to lower densities of their preferred host tree types.



▲ Students plant an American elm tree on the Colorado State University campus for a Tree Campus USA® Arbor Day event. Photo: Bill Cotton, Colorado State University

## More than Planting Trees: The Broader Scope of Community Forestry

Although planting trees is an important and highly visible aspect of what community foresters accomplish, their roles and responsibilities are far greater. Urban and community forestry encompasses the broad stewardship and management of urban natural resources, having impacts on not just trees, but everything from wildlife to air and water quality.

Foresters working for municipal, county, state and higher education organizations help create healthier, more livable urban environments through active management of community trees. These include everything from street and yard trees on private property to public trees in green spaces, parks, cemeteries and school grounds.

Some of the many public needs addressed by urban and community forestry include:

- **Planning next-generation urban forests** – Foresters create management plans that offer a vision for the next urban forest and strategies, budgets and proposals to accomplish the vision. Of primary

importance is ensuring tree diversity in our urban forests, rather than planting too many of any one tree type – which creates vulnerability to host-specific insect and disease threats.

- **Tree inventory and assessment** – Surveys provide data on location, species, condition and management needs for individual trees, and help identify which trees a municipality will manage. The value of each tree can be calculated using attributes including tree condition, size and species. Tree canopy analyses help with developing plans to mitigate urban heat islands and meet canopy cover goals.
- **Public safety** – If not cut, dead or weakened trees will eventually fall. Foresters accomplish tree risk assessments and are involved with removing high-risk trees from parks and other public lands.
- **Comprehensive tree care** – Community foresters do indeed plant trees – lots of them – largely to replace lost trees. But attention to a tree doesn't end with

its planting. To remain healthy, urban trees require maintenance, watering and frequent pruning to care for storm-damaged trees and enhance tree form and function.

- **Education and outreach** – Because so many trees in urban and community settings are located on private land, foresters must provide guidance to citizens on proper tree selection and planting techniques; highlight the benefits of trees to the next generation; and train volunteers to garner citizen support. They also provide educational opportunities for arborists, tree care companies and nurseries.
- **Policy and regulation** – Foresters help communities establish tree advisory groups, form policies, advise decision-makers and advocate for urban trees. They also work with municipalities to establish tree ordinances and regulations to provide authority and direction for forestry programs.
- **Invasive species planning and response** – Often requiring interagency collaboration, efforts to proactively contain and control invasive species across property lines are an important part of urban and community forestry.
- **Urban wood utilization** – Wood from trees removed for public safety, because of insects or disease, or for any other reasons can provide many benefits. By using these trees to make wood products, the costs of removal can be offset and communities can improve their local economies by supporting forest product manufacturing jobs. Also, the resulting products can help reduce Colorado's dependence on imports. Currently, more than 90 percent of all forest products consumed in the state are imported.



▲ Growing conditions can be tough for trees to thrive in Colorado. Trees like these shown here require continued maintenance, watering and frequent pruning to thrive in a community setting. Photo: Bill Cotton, Colorado State University

## Grand Junction: A Community Forestry Leader in Colorado

Grand Junction, the largest city in western Colorado, has become a leader in community forestry for not only the Western Slope, but for the state as a whole. In the past several years, the city has made major achievements toward advancing its community forestry program, recognizing forestry achievements in the community and enhancing the urban forests enjoyed by its nearly 60,000 residents.

“We’re proud that the City of Grand Junction has made such a strong commitment to managing and caring for its urban forest,” said Kamie Long, assistant district forester for the Colorado State Forest Service (CSFS) Grand Junction District and chair of the city’s Forestry Advisory Board. “The support of the community, City Council and City Forestry crew have made Grand Junction a more beautiful place to live year-round.”

Major urban and community forestry accomplishments in Grand Junction in recent years include the following:

- **More than 30 years as a Tree City USA** – In 2014, the CSFS and Arbor Day Foundation recognized Grand Junction with this designation for the 31st consecutive year, for meeting core standards of sound urban forestry management and demonstrating a commitment to caring for and managing its public trees.
- **A local Tree Campus USA** – Colorado Mesa University retains this recognition, also designated by the Arbor Day Foundation. In 2014, university students planted three trees on campus to celebrate Arbor Day and planted 15 trees on the Western Colorado Community College campus in the fall as their service project.
- **An extensive urban tree inventory** – Since 2012, the CSFS has led efforts to map and gather data on nearly 5,000 public trees in the heart of Grand Junction. Urban tree inventories help identify tree species, hazardous trees, pruning needs, insect problems, incidence of disease and open spaces available for tree planting. Grand Junction’s tree inventory has yielded information including an estimated total value of the city’s trees (more than \$14 million) and the number and location of ash trees in the inventoried area – more important than ever with emerald ash borer (EAB) now confirmed in Colorado.
- **Award-winning community landscapes** – In 2011, the city won the Gold Leaf Award for Outstanding Community Landscape Beautification from the International Society of Arboriculture – Rocky Mountain Chapter for its Downtown Uplift Project. The completed project resulted in a renovation of the original Main Street landscaping, originally completed in 1962, with improvements that included replacing dying trees and installing water features, play areas and shade shelters for an enhanced urban forest.
- **An education-oriented arboretum** – The Lincoln Park Arboretum showcases 69 tree species, and allows visitors tours that can be guided via smartphone. Two State Champion Trees, which are the largest known specimens of their species in Colorado, are located in the park – a weeping mulberry and London planetree.



▲ Volunteers install sign posts for the Lincoln Park Arboretum, which showcases 69 tree species. Photo: City of Grand Junction



▲ Grand Junction has been a recognized Tree City USA® for more than 30 years, demonstrating a commitment to manage and care for its public trees. Photo: City of Grand Junction



▲ Renovation of Grand Junction’s Main Street included replacement of unhealthy and hazardous trees with a diverse selection of tree species, retaining the healthy and mature trees where appropriate, and the addition of play areas and shade shelters. Photo: City of Grand Junction

## Managing an Emerging Pest in Colorado: Emerald Ash Borer

In September 2013, emerald ash borer (EAB) was confirmed for the first time in Colorado, in the City of Boulder. The highly destructive, non-native insect is responsible for the death or decline of millions of ash trees in more than 20 states and has already cost communities in the eastern U.S. billions of dollars to treat, remove and replace ash trees. It now poses a serious threat to Colorado's urban forests, where ash trees comprise an estimated 15 percent or more of all trees.

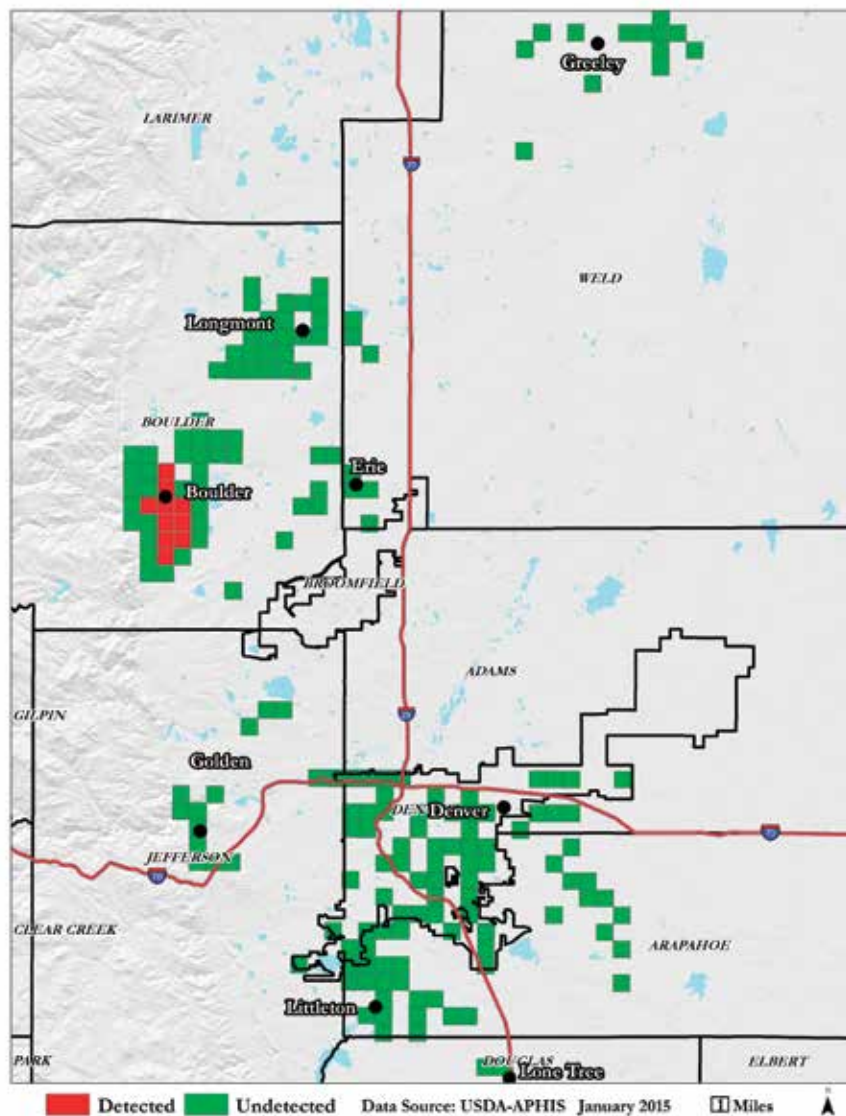
Since the initial detection of EAB in the state, the Colorado Emerald Ash Borer

Response Team has taken various actions to manage the spread of EAB in Colorado, which include:

- establishing a quarantine for Boulder County and surrounding areas to reduce the human-assisted spread of EAB in Colorado, through the movement of firewood, nursery stock and other raw ash wood
- conducting outreach efforts to inform professionals (e.g., nurseries and tree care companies) and the public about the importance of not transporting ash trees and wood, to slow the spread of EAB

- working with communities throughout the Front Range to implement ongoing detection actions to evaluate the possible presence of EAB outside of Boulder
- ensuring that landowners and city foresters know how to recognize ash trees and signs of EAB infestation; when to consider applying chemical treatments to protect high-value trees; and guidelines to determine when to consider removal of ash trees
- implementing a monitoring/detection process to determine the extent of infestation, which primarily involves sampling the branches of ash trees in the area surrounding the initial detection
- holding branch dissection workshops for the green industry, certified arborists and municipal foresters to teach hands-on branch peeling techniques and visual signs and symptoms of the pest, through inspection of infested wood within the quarantine zone
- introducing biocontrol measures – in the form of stingless, parasitic wasps that target and kill EAB larvae – in the area of infestation to help suppress EAB populations and manage the insect's potential future spread
- working to develop a statewide urban tree inventory map to help manage EAB and plan for the future urban forest

### Emerald Ash Borer Detection and Monitoring



▲ Emerald ash borer is responsible for the death or decline of millions of ash trees in more than 20 states. Photo: Howard Russell, Michigan State University, [www.forestryimages.org](http://www.forestryimages.org)

▲ Since the fall of 2013, many Front Range communities have worked with the Colorado EAB Response Team to conduct branch sampling or other detection efforts for EAB. (Data as of Jan. 16, 2015. Source: USDA)

The EAB Response Team will alert the public if the insect is confirmed elsewhere in the state. For current information about EAB in Colorado, including maps showing the extent of known infestation and the quarantine in Boulder County and surrounding areas, go to [www.eabcolorado.com](http://www.eabcolorado.com).



▲ The Colorado EAB Response Team holds branch dissection workshops in Boulder to demonstrate how to find EAB in infested trees. Photo: Ryan Lockwood, CSFS



▲ A CSFS forester and Colorado State University Extension specialist assess the branch of an ash tree to determine if it is infested with EAB. Photo: Ryan Lockwood, CSFS

## ***Barr Lake State Park: Restoration and Education Through Collaboration***

Only a half-hour drive from downtown Denver, Barr Lake State Park is located in Adams County near Brighton. The park offers a variety of outdoor activities, from fishing and hunting to boating, hiking and cycling. Birders and other recreationists also come to utilize the wildlife viewing stations and experience the park's wildlife refuge, home to more than 350 species of birds – including wintering bald eagles.

Many visitors may not be aware that despite the thriving wildlife and idyllic setting for recreation, invasive Russian-olive trees have long been established in riparian areas within the park. Introduced to Colorado in the early 1900s, this shrub-like tree can be identified by its sharp thorns, slender silvery leaves and olive-like fruit. It is one of the more widespread invasive trees in Colorado, and can be seen growing in riparian and urban settings throughout lower elevations around the state, where it competes with and displaces native cottonwoods, willows and other tree species more beneficial to riparian environments.

To help restore the park landscape to a more natural setting, Colorado Parks and Wildlife (CPW) has partnered with the Colorado State Forest Service in developing a Russian-olive removal project to eradicate the invasive trees from the park, and encourage native trees to thrive in their place. Working along the northern portion of the park in coordination with adjacent city and county property managers, the CSFS, CPW,

Adams County, Rocky Mountain Bird Observatory, Barr-Milton Watershed Association, Farmers Reservoir & Irrigation Company and the City of Brighton have been removing the invasive trees and treating their stumps with herbicide to prevent their return. In 2014, more than 100 Russian-olive trees were removed through the collaborative efforts of state and county staff, and assistance from volunteers and contractors.

For Barr Lake Appreciation Day in July 2014, 180 volunteers led by CPW and the CSFS planted 80 native trees and shrubs, removed 65 Russian-olives and pulled 60 garbage bags-worth of weeds. And in September, the agencies and partners hosted a one-day Riparian Restoration Workshop at Barr Lake to help inform riparian landowners and decision-makers about Russian-olive management, and provide habitat restoration training for resource professionals addressing the Platte and Republican River watersheds. The 124 attendees also planted native trees where Russian-olives had been removed.



▲ A volunteer sawyer removes a Russian-olive tree on Barr Lake Appreciation Day. Photo: CSFS

## Partnerships Essential to Addressing Community Forestry Challenges

Just as in Colorado's mountain forests, community forestry concerns do not stop at property lines. In our cities and towns, where land ownership is highly segmented, partnerships become even more critical to address forestry challenges and allow agencies to pool resources. Highlighted below are three prominent community forestry partnerships in Colorado.

### **Emerald Ash Borer Response Team**

Initially formed in 2013 in response to the arrival of the highly destructive emerald ash borer (EAB) in our state, the Colorado Emerald Ash Borer Response Team is now comprised of members from nine agencies/organizations:

Colorado Department of Agriculture, Boulder County, City of Boulder, Colorado State Forest Service, Colorado State University Extension, Colorado Tree Coalition, Green Industries of Colorado, University of Colorado and USDA Animal and Plant Health Inspection Service. The team structure is based on the Incident Command System (ICS), a management hierarchy used to respond to disasters including wildfires, floods and tornadoes. Benefits of the team's interagency structure include central authority, defined management roles, shared responsibility, reduced costs (by avoiding duplication of efforts and excess overhead), regular communication and information sharing.

Responding to EAB effectively requires more than the partners on the official response team. Other partners playing a vital role in the state's response include the City and County of Denver, Colorado Nursery and Greenhouse Association, CSU Plant Diagnostics Clinic, Front Range Urban Forestry Council, Emerging Pests in Colorado (EPIC) Committee and USDA Forest Service.

EAB Response Team monitoring efforts in 2014 revealed the presence of the pest in additional areas of Boulder. To date, EAB has not been confirmed outside the city, but the team is working with communities along the Front Range to conduct further sampling.

## Mitigating Wildfire Risk Saves Lives, Protects Forestlands

Wildland fires are a natural part of Colorado's varied forest ecosystems, but a long history of fire suppression has led to the dangerous build-up of fuels in some areas. Although the 2014 wildfire season was relatively quiet in Colorado, catastrophic fires remain an ever-present threat to our forests, water supplies and communities located in the wildland-urban interface (WUI) – any area where human developments and structures intermingle with wildland vegetative fuels.

Overly dense forests set the stage for exceptionally large, intense wildfires that threaten human life, destroy property and cause profound negative impacts to watersheds and wildlife. Forest management work, including forest thinning to reduce fuels and create fuelbreaks, is intended to alter fire behavior by slowing its spread and intensity. This can make fires that do occur more manageable for firefighters, and reduce the footprint of large, intense burns.

As the lead state agency providing wildfire mitigation expertise to private landowners and communities, the Colorado State Forest Service administers the national Firewise Communities/USA® recognition program to provide a template for wildfire safety at the neighborhood level. The CSFS serves as the liaison between communities and the National Fire Protection Association in implementing the program, to help private landowners with wildfire mitigation and education efforts, and recognize them for taking steps to reduce their wildfire risk. With 30 new communities added in 2014 alone, 115 communities in the state had received this designation by year's end, making



▲ The CSFS, Glenwood Springs Fire Department and Upper Colorado River Interagency Fire Management Grand Junction Office recognized the first Firewise Communities in Garfield County in 2014. Photo: Barbara Jackson, Glenwood Springs Fire Department

Colorado only the third state to achieve more than a hundred Firewise Communities/USA.

The CSFS also works with communities to develop Community Wildfire Protection Plans (CWPPs), which bring together diverse local interests to address protection of homes and infrastructure, and identify areas where fuels reduction is needed to reduce wildfire threats to communities. There are now more than 220 CWPPs in Colorado, with 46 of these being county-wide plans.

## Colorado Tree Coalition

The Colorado Tree Coalition (CTC) is a volunteer, non-profit organization whose mission is “leading statewide efforts to preserve, renew and enhance community forests.” Members represent a range of public and private agencies including the CSFS, USDA Forest Service, numerous municipalities, private tree-care companies, nurseries, other non-governmental organizations and private citizens. Since incorporating as a non-profit in 1995, CTC has grown and branched out to all corners of Colorado.

CTC works closely with partners such as the USDA Forest Service, the CSFS, Xcel Energy and several corporate and private sponsors to provide programs and services to communities across the state. Programs administered by CTC include tracking all Colorado Champion Trees, providing a Tree Risk Assessment program to assist tree managers and offering an annual fifth-grade Arbor Day Poster Contest. The organization’s Trees Across Colorado program provides low-cost trees to Colorado communities, and the ReForest Colorado program helps communities recover from natural disasters. Also, since 1991 CTC has awarded grants totaling more than \$740,000, matched by over \$7.6 million in community funding and/or time. As a result of these grants, nearly 70,000 trees have been planted throughout the state.

CTC is a membership-driven organization, and it encourages individuals, organizations and communities across Colorado to become members and get involved.

## South Platte River Urban Waters Partnership

The South Platte River Urban Waters Partnership (SPRUWP) is a regional consortium of organizations focused on water quality, water protection and enhancement of the ecological infrastructure systems that affect water resources in the Metro Denver area. Coordinated by the CSFS, other partners include the USDA Forest Service, Environmental Protection Agency, Colorado Department of Public Health and Environment, Tri-County Health, Denver Environmental Health, Denver Water, Aurora Water, Groundwork Denver, Coalition for the Upper South Platte and many others.

The South Platte River in Denver was one of seven pilot locations throughout the U.S. selected to receive assistance from the Urban Waters Federal Partnership in 2012-2013. The federal partnership, and local partnerships like the one in Denver, were created to reconnect urban communities – especially those that are underserved or economically stressed – with their local waterways, and to improve collaboration among agencies striving to improve the quality of those waters.

The partnership helps improve the quality and accessibility of Denver-area waterways, largely through urban forestry practices like planting native trees and educating the public. Specific program objectives include addressing waterway protection and restoration, ensuring community involvement and education, and working with local officials and community-based organizations to leverage local expertise and funding.



▲ Trees continually capture and store carbon, absorb pollutants and cleanse the air. Photo: CSFS



▲ Tara Costanzo, a CSFS volunteer, measures the diameter of a tree. Tree inventories are important for communities to plan for long-term management and care. Photo: Jamie Dahl, CSFS

## Walnut Tree Disease Continues to Spread in Colorado

Thousand cankers disease (TCD), which infests and kills black walnut trees, is caused by a fungus (*Geosmithia morbida*) carried by the walnut twig beetle (*Pityophthorus juglandis*). It produces small cankers and causes dieback on branches; repeated attacks by the beetle eventually cause tree death. Currently, there are no effective methods for saving trees with the disease.

The past range of the walnut twig beetle did not include Colorado. After spreading into Colorado more than a decade ago, TCD has caused significant tree mortality in many of the state's urban forests, and is presently active primarily along the Front Range from Fort Collins to Pueblo and Cañon City.

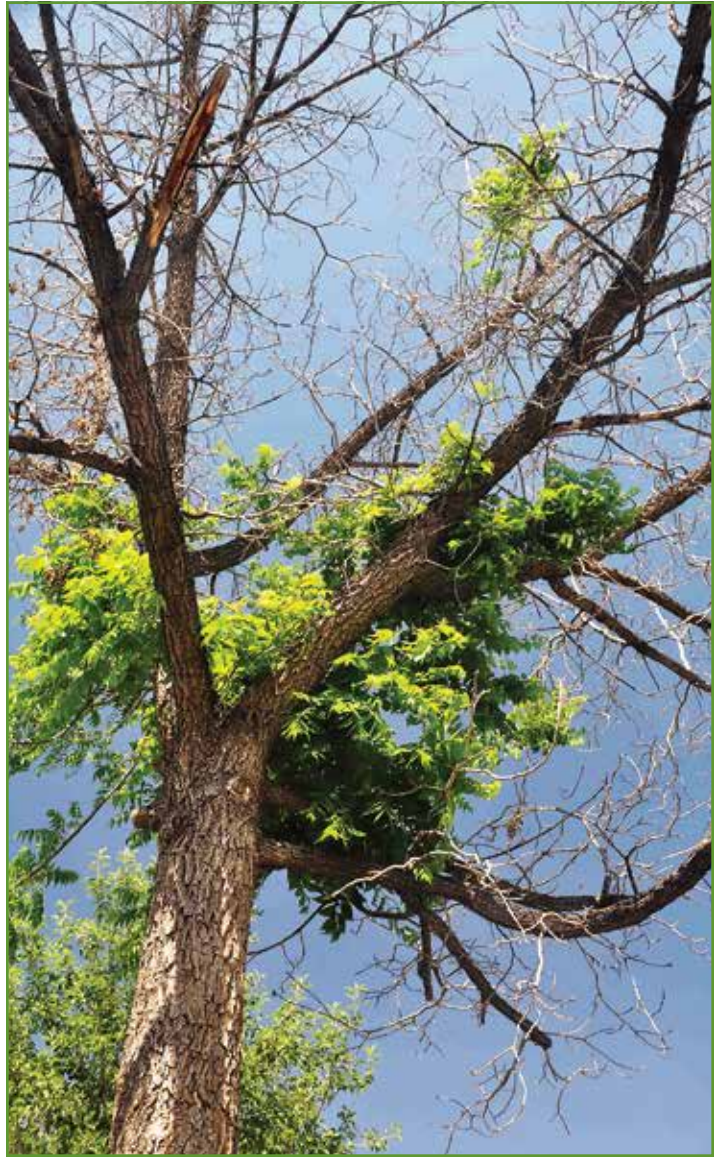
### Spread of TCD in 2014

Due to the continued spread of TCD in Colorado, the Colorado State Forest Service, Colorado State University Extension, CSU Plant Diagnostics Clinic and partner agencies are actively involved in monitoring the state's black walnut trees. In 2014, these collaborative efforts revealed that black walnut mortality continued to increase in Denver, Pueblo and Fort Collins. TCD also was confirmed in Fort Morgan – farther east in the state than previously documented – where it likely arrived through the movement of infested wood. Also, the walnut twig beetle was confirmed for the first time near the Kansas border in Kiowa County.

The human-assisted spread of TCD farther eastward from Colorado could impact large numbers of commercially valuable walnut trees in the Midwest, where many states already have quarantines prohibiting the movement of walnut material.

### TCD Research at the CSFS Nursery

No controls have been identified to effectively manage TCD, but researchers from Colorado State University are working to determine potential management solutions. In 2014, CSU entomologists Whitney Cranshaw and Ned Tisserat conducted three TCD studies at the CSFS Nursery in Fort Collins. One study involved the planting of 800 black walnut seedlings, derived from seed sources around the country, to evaluate geographic differences among black walnut strains in their susceptibility to *Geosmithia*. Another trial evaluating the relative susceptibility of black walnuts to different strains of the fungus indicated that all strains tested were capable of causing the disease, although possibly to varying degrees. And a third study involved trying to control the course of TCD in tree hosts. The results of that study are pending.



▲ Thousand cankers disease continued to spread in black walnut trees, primarily along the Front Range. Photo: William M. Ciesla



## We All Play a Role in Achieving Healthy Forests

This report highlighted the many benefits of urban and community forests in Colorado. It also described the threats urban and community trees face, and some of the actions critical to address those challenges. Dealing with these challenges requires ongoing actions by community foresters, private citizens, green industry groups and other diverse partners – actions including the planting of new trees, caring for existing trees, preparing for insect and disease threats, facilitating wood utilization and planning next-generation urban forests.

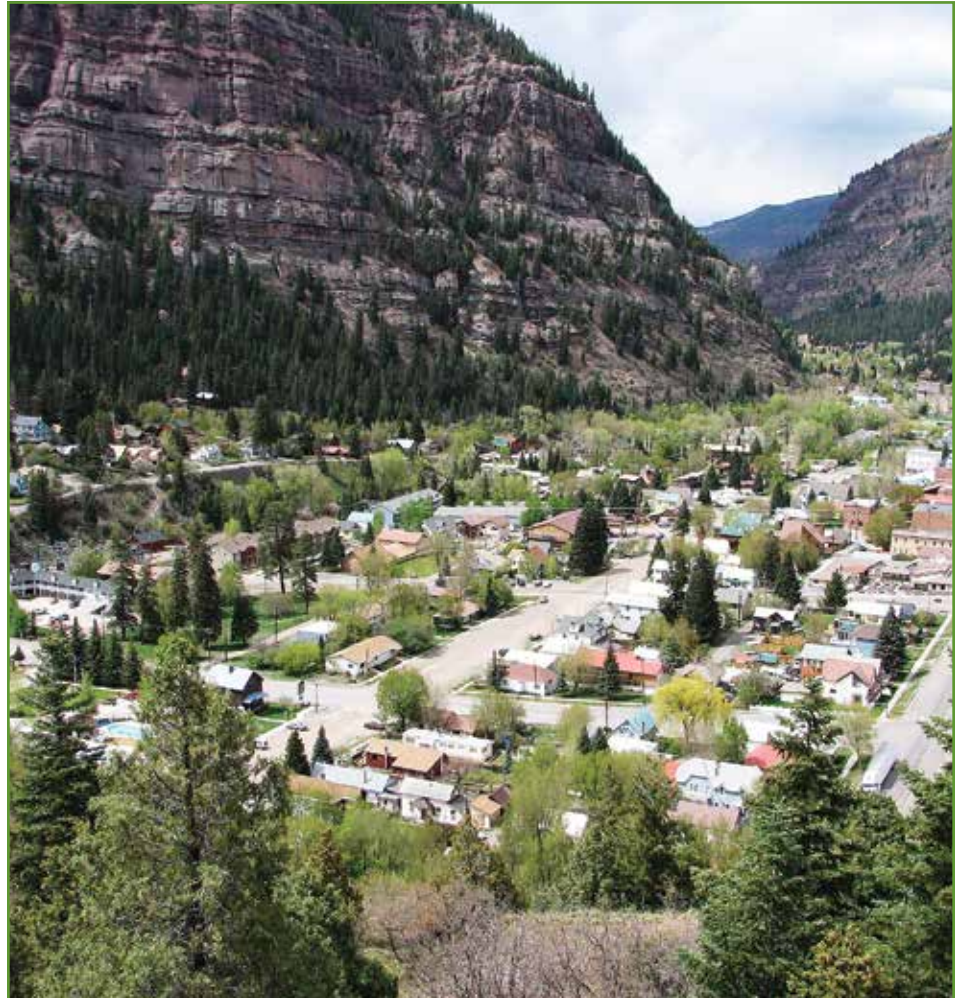
The trees growing in our urban and community forests have the potential to outlive each of us, but only if we ensure their ongoing health. An investment in them will provide shade and comfort for those who live among them, and continue to do so for generations.

We can all play a role in our own communities when it comes to addressing forest health. We encourage you to take simple steps such as knowing which trees are growing on your property, and in your parks and neighborhood; keeping an eye on the health of local trees; planting diverse tree species; recognizing the numerous benefits of urban and community trees and advocating their value to others; and not moving firewood or other raw wood that could mistakenly transport tree-killing pests to new locations.

The Colorado State Forest Service offers communities technical assistance for tree planning, planting, care and maintenance needs, and works with community leaders, city foresters, parks and public works departments, and private landowners to ensure best practices for achieving healthy trees. Thanks to the efforts of the CSFS and municipal foresters and their partners, Colorado now boasts more than 90 communities with an official designation as a Tree City USA® by the Arbor Day Foundation. It is evident that Colorado communities really care about their trees.

Community forestry challenges do not stop at property lines, and successful management of our community forests can only be accomplished through the collaborative efforts of various stakeholders – including federal, state, county and local government; private

landowners and citizens; professional tree growers; private tree care companies and other green industry organizations; and non-profit groups. We all need to invest in our urban and community forests, because an investment in them is an investment for all of Colorado.



▲ Urban trees attract people, which in turn attract businesses and tourism. Ouray, Colo., shown here, offers scenic landscapes and recreation opportunities. Photo: CSFS

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## Additional Resources

- 2014 Colorado Forest Insect and Disease Update, [www.csfs.colostate.edu](http://www.csfs.colostate.edu)
- Colorado Emerald Ash Borer information, [www.eabcolorado.com](http://www.eabcolorado.com)
- Colorado State Forest Service, [www.csfs.colostate.edu](http://www.csfs.colostate.edu)
- Colorado Tree Coalition, [www.coloradotrees.org](http://www.coloradotrees.org)
- Firewise Communities/USA Program, [www.firewise.org](http://www.firewise.org)
- South Platte River Urban Waters Partnership, [www.urbanwaters.gov/splatte](http://www.urbanwaters.gov/splatte)

► Urban trees provide aesthetic appeal and a more pleasant atmosphere for people to live and work. Photo: Bill Cotton, Colorado State University





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