

A STRATEGY FOR ADVANCING URBAN FORESTRY IN THE PORTLAND – VANCOUVER REGION

Fall 2015



About this Project

This project was undertaken by the Oregon Department of Forestry, Washington Department of Natural Resources, and the Portland area's regional government, Metro working as part of a broad collaborative called The Intertwine Alliance. The project was made possible with a grant from the USDA Forest Service. The USDA is an equal opportunity provider and employer.

Project Partners



This project is an integral part of a broader community vision. Learn more at www.theintertwine.org

Cover Neighborhood Tree Canopy Photo Credit Mike Houck

CONTENTS

BACKGROUND ON THE INTERTWINE ALLIANCE AND PROJECT PARTNERS.....	4
THE INTERTWINE ALLIANCE: A PLATFORM FOR COLLABORATION	4
PROJECT PARTNERS	4
CURRENT CONDITIONS AND CHALLENGES.....	5
SUMMARY OF THE REGION	5
THE PORTLAND-VANCOUVER URBAN FOREST	5
<i>Urban Forest Benefits</i>	6
<i>Regional Canopy Cover</i>	8
<i>Quantifying Benefits and Costs</i>	10
<i>Urban Forest Management Issues</i>	11
RECOMMENDATIONS	16
STRATEGY	18
CREATE AND DISTRIBUTE TARGETED MESSAGING ABOUT THE ECOLOGICAL, SOCIAL, AND ECONOMIC BENEFITS AND SERVICES OF THE URBAN FOREST	18
<i>Policymaker Engagement</i>	18
<i>Public Engagement</i>	18
<i>Our Common Ground Campaign</i>	19
ESTABLISH COMPREHENSIVE AND ADAPTIVE URBAN FOREST MANAGEMENT TOOLS THAT PROVIDE LONG-TERM SUPPORT FOR THE URBAN FOREST.....	19
<i>Urban Forestry Management Cohort</i>	19
<i>Urban Forestry Forums</i>	20
STRUCTURE AN OUTREACH MODEL THAT CONNECTS URBAN FORESTRY WITH THE BROADER INTERESTS AND OBJECTIVES OF THE COMMUNITY	20
<i>Health and Nature Initiative</i>	20
<i>Ecosystem Services Initiative</i>	21
<i>Youth Engagement with Urban Forestry</i>	22
CONCLUSION	22
REFERENCES	23

BACKGROUND ON THE INTERTWINE ALLIANCE AND PROJECT PARTNERS

THE INTERTWINE ALLIANCE: A PLATFORM FOR COLLABORATION

The Intertwine Alliance is a coalition of more than 140 private firms, public agencies and nonprofit organizations working together to more deeply integrate nature into the Portland-Vancouver metropolitan region. The Alliance works to attract new investment, better leverage existing investments, and more fully engage residents with the outdoors and nature.

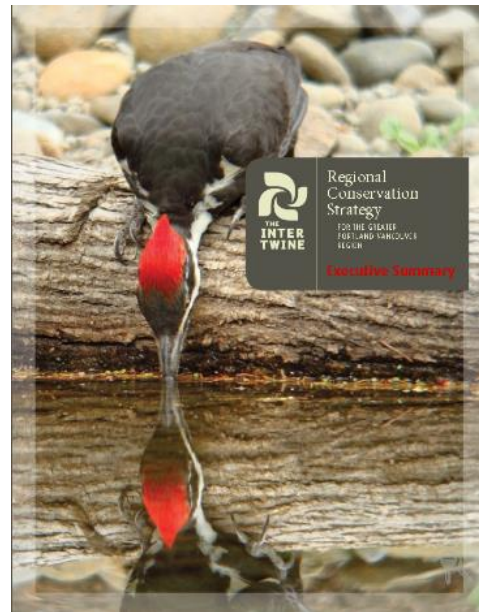
The Alliance exists to ensure that people of all ages discover they can enjoy the outdoors near where they live. Therefore the health of our region's urban forests becomes paramount. By increasing investments in our urban forests and natural habitats we make our region more attractive to new businesses and help our existing companies attract talent. These investments reduce utility and transportation costs and keep our water clean.

The Intertwine Alliance accomplishes these ends by facilitating deeper collaboration among its partners. The highest and most rigorous form of collaboration is an approach called "Collective Impact." Collective impact is the commitment of a coalition of organizations from different sectors to a common agenda for addressing a complex social or environmental challenge. As part of this project, the Portland / Vancouver region took its first steps towards a collective impact approach to urban forestry.

The Intertwine Alliance is helping to build a national network of metropolitan conservation coalitions. This national network is called the Metropolitan Greenspaces Alliance (MGA). The MGA is expanding rapidly, growing from seven US cities to thirteen last year. Through the MGA, The Alliance has begun to share the learnings of this project with other US cities and sees the enormous potential of raising all the boats in building this learning community.

PROJECT PARTNERS

Project leadership was provided by several Intertwine Alliance partners: The Oregon Department of Forestry, Washington Department of Natural Resources and the Portland area's Metro regional government. Tualatin Riverkeepers also played a key role.

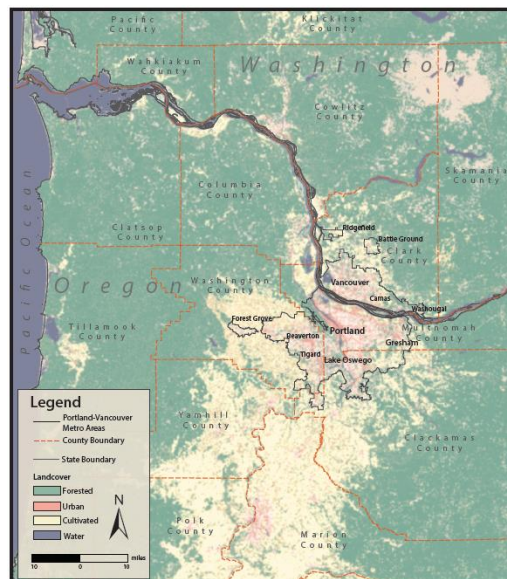


CURRENT CONDITIONS AND CHALLENGES

SUMMARY OF THE REGION

The Portland-Vancouver region covers an area of over 1,800,000 acres, or 2,800 square miles, primarily located within Clark, Multnomah, Clackamas, and Columbia counties. This region is geographically and biologically diverse, nestled between the Cascades to the north and east and Coast Range Mountains to the west and extending south into the Willamette Valley.

The land cover of the Portland-Vancouver region is a mix of urban and rural uses, developed lands and natural areas, hard streetscape and high-functioning habitats. While portions of the region are largely forested or agricultural, the majority has been developed into the cities, towns, and neighborhoods in which we live. Nearly one-fifth of the region falls within urban growth boundaries (which in Washington are known as urban growth areas) and includes the cities of Portland, Vancouver, Beaverton, and Hillsboro along with many smaller municipalities. Because urban areas are traditionally associated with high levels of development, such as building and pavement, it would be expected that they lacked natural features. However, a valuable natural resource exists within the Portland-Vancouver metropolitan region– the urban forest.



THE PORTLAND-VANCOUVER URBAN FOREST

The urban forest is an integral part of our region's ecosystem, whose numerous elements interact to significantly affect the quality of urban life (Nowak et al. 2010). Not only are trees a valuable natural resource, but money spent on trees is a good investment. Urban forests are also place-makers that are vital to livability and give a community visual character, unity, and identity.

The term urban forest refers to all publicly and privately owned trees within an urban area. The urban forest is therefore an inclusive tree canopy across a city or region made up of individual trees, groves, or patch forests (National Urban and Community Forestry Advisory Council 2006), and includes trees along streets, parks, open spaces, backyards, and riparian areas as well as larger stands of remnant forests (Dreistadt et al. 1990; Nowak et al. 2001).

What Is Urban Forestry?

(Nowak et al. 2010)
Management of urban trees and associated resources to sustain urban forest cover, health, and numerous socioeconomic and ecosystem services is known as urban forestry. Because of land jurisdiction issues, urban foresters typically focus on trees located along streets as well as in public parks and natural areas. However, since one of the main goals of urban forestry is to optimize forest benefits for society, urban foresters can also help guide the management of trees on private lands, which typically dominate the overall urban forest composition.

Urban Forest Benefits

Given that over 2 million people live in the greater Portland-Vancouver metropolitan area, the benefits provided by urban forests influence the everyday lives of all residents. Across the region, urban forests are estimated to contain about 6.9 million trees¹ (Nowak et al. 2008), with an estimated structural asset value of \$4.3 billion² (Nowak et al. 2002). This dollar value reflects only a portion of the total worth of the urban forest, however (Nowak et al. 2010). Beyond aesthetics, urban forests also provide innumerable other services that affect both the local physical environment and the social environment in the places we live, work, learn, and play (McPherson 2006; Nowak et al. 2010). Here are just a few of the benefits and services that urban trees provide:

- **Air quality** – Perhaps the most recognized benefit is a tree’s ability to improve air quality. Trees trap and filter harmful emissions and pollutants by exchanging gases with the atmosphere and capturing particulates such as ozone and carbon monoxide in their leaves (Dwyer et al. 1992; McPherson et al. 2002). Since the emission of many air pollutants increases with higher temperatures, trees can further improve air quality by lowering air temperatures through their shade factor.
- **Water quality and flow** – Street and yard trees assist in facilitating urban hydrological processes. Tree canopies capture precipitation, and root systems intercept and retain rainwater (Nowak and Dwyer 2007), both decreasing the amount and volume of storm water runoff. This interception reduces the likelihood of urban flooding events and stormwater management costs (Dwyer et al. 1992) and can even improve water quality by ensuring that pollutants present on hard surfaces are not deposited into waterways. It is estimated that 100 mature trees intercept about 250,000 gallons of rainwater per year, reducing stormwater run-off and providing clean water.
- **Erosion control and soil quality** – Tree roots decrease erosion by holding the soil in place and allow water to slowly infiltrate the soil (Brienzo 2005; Chaloux 2012). These mechanisms help reduce flooding in the streets and sedimentation in streams. Trees and other plants also help remediate soils by absorbing, transforming, and containing a number of contaminants (Westphal and Isebrands 2001).
- **Wildlife habitat and biodiversity** – The urban forest helps provide additional ecological benefits to urban environments by creating and enhancing animal and plant habitat (Dwyer et al., 1992). Trees and associated plants provide shelter and food for a variety of birds and animals, increasing the biodiversity of urban natural systems. Parks and riparian areas containing trees also provide valuable wildlife corridors that reduce

¹ Based on average tree density of 63 trees per acre across 14 U.S. cities.

² Based on an average structural asset value of approximately \$630 per tree across 8 U.S. cities.

habitat fragmentation and can act as “reservoirs” for endangered species (Howenstine 1993). Urban forest wildlife offer enjoyment to city dwellers (Shaw et al. 1985) as well and can serve as indicators of local environmental health (VanDruff et al. 1995).

- **Real estate and property values** – Urban forests are a strategic public and private investment. Landscaping with trees – in yards, in parks and greenways, and along streets – can increase property values within a community. For example, trees in urban residential areas can enhance real estate sales by 3 to 7 percent (Anderson et al. 1985; Nowak and Dwyer 2007). Buyers are attracted to a green landscape and are willing to pay as much as \$25,000 more for a home that has a treed landscape (Burden 2008). Not only do individual trees affect property value for individual residents, but having a park nearby or street trees adjacent to a house will increase property value as well. Many towns plant trees along street boulevards to increase adjacent property values, which in turn directly benefit the local community through property taxes (Dwyer et al. 1992).
- **Economic development** – Healthy mature trees are a major economic asset for attracting and retaining residents, businesses and visitors. Urban trees help to maintain economic stability, enhancing commercial and retail district appeal and offering higher occupancy and rental/lease rates. Tree-lined streets create more enjoyable shopping experiences, bringing more dollars into the community. Urban trees in downtown shopping areas have been shown to positively affect judgments of visual quality, and to positively influence consumer responses and behaviors (Dwyer and Nowak 2000; Wolf 2005). One study conducted by the University of Washington showed that consumers were willing to pay 9 percent more in small cities and 12 percent more in large cities for equivalent goods and services in business districts having trees (Wolf 2005).
- **Regional tourism** - By purifying water and promoting cleaner waterways, trees contribute to regional tourism that involves outdoor recreation boosting visitation to many of the region’s most popular natural attractions.
- **Local climate and energy use** – Trees influence thermal comfort and energy use by providing shade, transpiring moisture, and reducing wind speed. The proper placement of urban trees can contribute to cost-saving energy reductions by shading and screening. For example, strategically planting trees on an exposed southern side of a building can shade the building, reducing cooling costs by as much as 25% (Akbari 2002). The effect of tree canopies also reflects solar radiation, providing shade that helps cool the pavement that can increase pavement life up to 60% (Maco and McPherson 2002).

- **Community well-being and involvement** – Trees preserve and enhance quality of life by offering a sense of place and the opportunity to embrace nature. Trees enhance public health and safety by providing a natural physical barrier along transportation corridors, reducing traffic speeds by narrowing drivers' field of vision, and creating walkable neighborhoods. A stronger sense of community, an empowerment of inner city residents to improve neighborhood conditions, and the promotion of environmental responsibility and ethics can be attributed to involvement in urban forestry efforts (USDA Forest Service 2003). Trees and landscaping create pedestrian-friendly streets, increasing the attractiveness of walking and active living, and have even been shown to lower crime primarily by bringing people together outdoors, increasing surveillance and discouraging criminal activity (Kuo et al. 2001).
- **Individual and community health** – Urban forests and greenways have significant, positive health influences, providing a wide range of physiological and psychological benefits that contribute to healthy communities. Research shows that trees and their associated vegetation have a relaxing effect on humans, giving us a general feeling of calmness and well-being. Access to urban greenspace, the natural areas within cities, has been shown to help reduce stress levels by providing a place for reflection and physical activity (Parsons et al. 1998). Patients with a window view of greenery also recover faster, suffer fewer complications, and need less medication than those without such views (Ulrich 1984). Urban greenspace also promotes physical activity which can further improve human health and reduce medical conditions such as obesity (Pikora et al. 2003) all the while encouraging residents to get outside and explore the community that they live in.

Regional Canopy Cover

As illustrated, urban forests are important resources that provide many essential functions and benefits within the cities where we live (Dwyer et al. 1992; McPherson 2006). The type, quality, and level of benefits provided, or costs accrued, however, is determined by the composition, distribution, and health of an urban forest. Because urban forests are dynamic, changing over time, forests must possess a mix of species, sizes, and ages that allow for continuity of benefits over time (Wolf and Kruger 2010).

Tree canopy cover can serve as one indicator of the extent to which trees and forests are providing critical services to local residents (Nowak et al. 2010). An assessment of urban tree cover, or the amount of urban land covered by tree canopies, can illustrate how urban tree cover and the associated benefits vary across a landscape. The amount of urban forest canopy cover varies widely in cities, depending in part on the location and size of the city, population density, development intensity, and surrounding natural vegetative cover. The density of trees in a city also varies based on such factors as intensity of development, natural vegetation type, tree management, and tree size distribution. Average tree density

in some U.S. cities has been found to range from 14.4 trees per acre in Jersey City, NJ, to 111.6 trees per ac in Atlanta, GA (Nowak et al. 2008). In urban areas, tree cover and density are typically greatest in parks, forests, and residential lands (Nowak et al. 1996).

Tree cover estimates for the Portland-Vancouver region were produced from a land cover model and data from the Regional Conservation Strategy (RCS) (The Intertwine Alliance 2012) (Table 1). This report indicates that more than 31 percent, or 110,200 acres, of the major urban areas in the Portland-Vancouver region are covered by trees. In comparison, areas that fall within the urban growth boundary consist of roughly 43 percent developed land cover (compared to 5 percent in areas outside urban growth boundaries).

Regional Conservation Strategy Viewer – Mapping Land Cover

Land cover information in this chapter comes from Chapter 1, “Current Conditions,” of the Biodiversity Guide for the Greater Portland-Vancouver Region. The Biodiversity Guide organizes the region’s different types of land cover into a variety of classifications, including trees and regenerating forest, shorter vegetation such as shrubs and meadows, agriculture, open water, and developed lands such as buildings, roads, and parking lots.

In addition to this guide, the Intertwine Alliance developed an online viewer that makes consistent land cover information available across the entire Portland-Vancouver metropolitan region. The data was developed using a combination of high-resolution color aerial photography, light detection and ranging (LiDAR), satellite imagery, and hand digitizing. The data appears in The Intertwine Alliance’s Regional Conservation Strategy and Biodiversity Guide.

The Regional Conservation Strategy viewer makes land cover information available at the regional, watershed and municipal scale. The Regional Conservation Strategy Viewer was presented to the region’s conservation and urban forestry practitioners at workshops held in 2013 in conjunction with Intertwine Alliance summits. The viewer is now being applied to projects across the region. For more information on the RCS mapping data or to map land cover of your community, visit: www.regionalconservationstrategy.org.

Tree cover can be further distributed into two basic classifications of trees. Deciduous trees, also known as broadleaf or hardwoods, make up approximately 37 percent of the region’s tree canopy. Deciduous trees such as Norway and red maple, flowering cherry, and London plane are commonly planted street and yard trees, while other species including Oregon white oak and red alder dominate the regions more native forested landscapes. Conifers, including Douglas-fir, western hemlock, and western red-cedar, comprise more than 62 percent of the canopy cover and are prevalent in many native forest remnants, parks, and natural areas. Region-wide, trees also cover about 55

TABLE 1. LAND USE ACROSS THE PORTLAND-VANCOUVER REGION	
LAND USE	REGIONAL PERCENT
TREE CANOPY	31.4%
DEVELOPED	42.7%
LOW VEGETATION	16.7%
AGRICULTURE	5.0%
WATER	4.2%

percent of the area within the immediate riparian zone (50 ft.) of streams and wetlands (Metro 2008), and range from 16-88 percent when viewed at a sub-watershed scale.

When looking within distinct urban, political boundaries, tree cover ranges from 13-54 percent depending on the city (Portland State University 2009). Several local jurisdictions have completed canopy cover assessments that provide a snapshot of urban tree cover across the region (Table 2). These values are reflective of the national urban tree canopy cover figure of 33% (Dwyer et al. 2003) and, combined with regional population growth indicators, suggest that urban forest conditions and issues in the Portland-Vancouver region are similar to other regions of the United States. American Forests, a national nonprofit conservation organization, also provides tree canopy recommendations for metropolitan areas in the Pacific Northwest specifically (Table 3) (American Forests 2008). These recommendations suggest that canopy cover in the Portland-Vancouver region is consistent with other areas in the Pacific Northwest region and provide good baseline percentages that can be used to set canopy cover goals.

TABLE 2. TREE COVER ACROSS PORTLAND-VANCOUVER REGION	
CITY	COVER PERCENT
GRESHAM	28.1%
LAKE OSWEGO	39.0%
PORTLAND	26.3%
TIGARD	24.5%
VANCOUVER	19.7%

TABLE 3. AMERICAN FORESTS TREE CANOPY RECOMMENDATIONS Metropolitan Areas in the Pacific Northwest	
AVERAGE TREE COVER ALL ZONES	40%
URBAN RESIDENTIAL	35%
SUBURBAN RESIDENTIAL	50%
CENTRAL BUSINESS DISTRICT	15%
COMMERCIAL & MIXED USE	25%
PARKS	25%

Quantifying Benefits and Costs

Despite much of the region being covered by tree canopy, many factors influence both the benefits derived and costs accrued from the urban forest. Recent studies (McPherson et al. 2002) found that two variables in particular affect the dollar value of a tree. One is the size of the tree: on average a small tree has one-tenth to one-third the value of a medium tree, and a medium tree has one-third to one-half the value of a large tree. The other variable is the tree species relative to its location – what we refer to as “the right tree, in the right place.” For example, a tree species that has low maintenance costs may be most valuable in a residential setting. A healthy community forest begins with careful planning which is reflected in principles like this.

Many communities are quantifying the benefits of trees so they can evaluate how growing their tree canopy can stimulate the local economy. For instance, the City of Vancouver, WA calculates that for every dollar spent on tree planting and maintenance, the city receives a 250 percent return on investment in terms of total services provided by those trees at maturity (City of Vancouver 2008). In other words, for every \$1 spent on a

community's urban forestry program, the community receives about \$2.50 in tree benefits (McPherson et al. 2002). Table 4 compares the benefits and costs of planting 100 street trees in a Pacific Northwest Community such as Gresham, OR. The comparison in this hypothetical example is made over a period of 40 years, or the normal lifecycle of an urban tree, and includes a diversity of sized trees to demonstrate the net economic benefit of urban trees.

TABLE 4. GENERAL COST SAVING FROM TREES IN THE PACIFIC NORTHWEST (McPherson et al. 2002)	
Costs = \$82,312	Benefits = \$225,396
Planting, pruning	Energy conservation
Removal/disposal	Air quality
Irrigation	Reduced run-off
Sidewalk repair	Real estate (aesthetics)
Leaf litter	Reduced health care costs
Legal/administrative	
Net Economic Benefit: \$143,084	

In fact, according to the U.S. Forest Service, Pacific Southwest Research Station (2011), a single large tree in the Pacific Northwest will provide \$2,820 in environmental and other benefits over its lifetime. Although benefits will vary over space and time, with over 6 million trees in Portland-Vancouver metropolitan region and 77 billion across urban areas in the U.S., the magnitude of the urban forest resource should not be ignored (Dwyer and Nowak 2000).

The Benefits of Trees in the Portland-Vancouver Region

- \$12.9 million: The comparable annualized cost to taxpayers for the installation of stormwater retention structures to match the services provided by Vancouver's existing tree canopy (City of Vancouver 2007).
- \$78.3 million: The value of air pollution removal services by Vancouver's trees, which intercept 17,000 tons of air pollution each year based on models developed by the USDA Forest Service (City of Vancouver 2007)
- \$20.2 billion: The stormwater retention value of the trees in the Willamette/Lower Columbia region.³⁴ These trees also save \$1.8 million annually in residential energy savings and remove 178 million pounds of pollutants annually, saving \$419 million. (Portland Parks and Recreation 2004).
- \$6.6 million: The NO₂- reducing benefit of Portland's urban forest. Reducing this noxious gas, which can exacerbate respiratory health problems, helps keeps kids in school, thwarts asthma attacks, curbs emergency room visits and helps elderly residents stay out of the hospital (Rao et al. 2014)

Urban Forest Management Issues

Effective urban forest management is essential for maintaining and enhancing these benefits for future generations. The management of urban forests typically involves a variety of activities such as inventorying tree populations; enacting tree and land use planning ordinances and policies; developing and implementing long-term management

and maintenance plans, annual work plans, and budgets; and promoting community education and participation (Dwyer et al. 1992, Elmendorf et al. 2003). Urban forest management has often been hampered however by challenges such as inconsistent management approaches, lack of funding, weak linkages with other resource management programs, and inadequate planning that fails to consider the surrounding ecosystem, the community, and the regional context (Nowak et al. 2010).

As understanding of the ecological and economic values of trees increases, so does recognition of the importance of urban forest management. In fact, the creation, conservation, and management of urban forests to achieve sustainability is a long-term goal of an increasing number of local communities. Today, urban forest management has expanded in the Portland-Vancouver region. Not only do the two largest cities, Portland and Vancouver, actively manage their trees, but communities of all size have begun to recognize the benefit of well-managed urban vegetation and greenspaces.

Although many jurisdictions do not have a specific urban forestry program, many departments have assumed responsibilities related to the management of trees on public and private property. In the Portland-Vancouver region, land use planning, community development, public works, and parks and recreation rank among the top departments responsible for urban tree management (Driscoll 2014). Local management approaches will vary however as a function and extent of the resource and must be considered with the context of the larger landscape and across city or county boundaries. Several recent research studies have attempted to better understand these approaches and to quantify current urban forestry program management efforts across the region.

One such study, completed by researchers at Portland State University (PSU) (2009), found that there is considerable variation in local urban forestry policies and programs in the Portland-Vancouver region. In compiling a synopsis of management activities, researchers determined that jurisdictions tend to fall into four categories with respect to the types of regulations they apply to urban trees: those that emphasize tree preservation, those that emphasize mitigation, those with limited regulation, and those with no regulations.

Policy goals relating to urban trees and/or urban forestry are applied in a diversity of ways within city and county governments. Primarily these goals are found within community resolutions and ordinances or in the form a comprehensive plan and relate to tree preservation, planting, and species diversity. The purpose or intent of such tree policies are connected to a number of broader objectives of the community such as to improving or maintaining water quality, wildlife habitat, and public health and safety and the protection of heritage/historic trees for aesthetics or scenic values (PSU 2009).

The PSU study estimates that over 20 jurisdictions in the region have urban tree preservation ordinances containing regulations and requirements governing the removal or preservation of trees on private land. A few jurisdictions have also included urban forestry policy goals within a strategic plan. Roughly seven cities and counties have developed and adopted formal urban forest management plans. The American Public Works Administration (APWA) (2011) suggests that urban forest management plans are an

essential planning tool for protecting the health and benefits of the forest resource within our communities. These plans are important as they specify the goals and objectives of the city or county related to their urban forest and make provisions for specific monitoring and maintenance or education and outreach activity to be conducted in the community. Considering goals and policies related to tree canopy cover, only several jurisdiction are known to have an inventory of tree cover, and even fewer have established targets for urban forest cover. The Intertwine Alliance hopes to increase the number of cities and counties making a strategic investment in the urban forest, and has challenged every government in the Portland-Vancouver metropolitan region to develop a plan to increase canopy cover as part of its Our Common Ground Report.

An additional program assessment survey was conducted by Oregon State University, in collaboration with the Oregon Department of Forestry, Washington Department of Natural Resources, and Metro regional government, to take an in-depth look at current practices and attitudes regarding urban forest management in the Portland-Vancouver region. This survey was sent to city and county representatives with the most potential to initiate, promote, and implement urban forestry programs and projects within their jurisdictions including both elected community officials and program managers.

Results of this survey indicate that, in general, urban forestry programs are important to cities and counties in the Portland-Vancouver region, and that most are interested in implementing and expanding urban tree programs. Respondents from city governments were more positive about these programs compared to counties, indicating

The Tree City USA program, administrated by the Arbor Day Foundation, is another framework for community forestry management that many cities in the Portland-Vancouver metropolitan region participate in. Sixteen cities throughout the region have been nationally recognized as a Tree City USA as of 2015. These cities have achieved Tree City USA status by meeting four core standards of urban forest management, including: 1) maintaining a tree board or department, 2) having a community tree ordinance, 3) spending at least \$2 per capita on urban forestry, and 4) celebrating Arbor Day (Arbor Day Foundation 2013). These standards allow all communities regardless of size or budget to be recognized for a high standard of management. Participation greatly benefits a city as well by increasing publicity, public image, citizen pride, and education within the jurisdiction related to its municipal trees (Fazio 1992).

that municipal governments may view urban forestry as more important to their jurisdictions and be more willing to advance these programs compared to county urban service areas. The following is a list of most commonly utilized program components or services used to manage the urban forest throughout the region:

- a structured maintenance program,
- trained staff,
- managing trees for environmental benefits,
- tree related ordinances,

- planting programs,
- riparian restoration, and
- preferred species planting lists.

Survey results reveal that these areas are also among the most important activities related to urban forest management by both community officials and program managers. Because of their importance, local jurisdictions have directed available resources and staff time toward the completion of these items and indicated that they had been fairly successful in achieving each of these identified areas.

Despite such widespread recognition of the importance of certain program items, the level of resources allocated to the management of urban forests varies greatly from one urban area to another. Several management areas have received relatively less support and interest from local jurisdictions. Items including a certified arborist on staff, a tree board or commission, a tree inventory, tree canopy cover goals, an urban forest management plan, and sustained program funding are identified as lacking in city and county governments throughout the region. Representatives from county governments also reported that they struggle to build support for and establish tree related ordinances, public outreach efforts, and partnerships with outside organizations in urban areas they serve. Survey results found that several additional management needs and barriers have hindered the effective management of the forest resource. The need for increased or sustainable funding and tools for community outreach and education are prevalent throughout local municipalities and counties. A lack of political support and low public support as well as a history of conflicts surrounding urban trees have also inhibited urban forest programs as communities have been slow to prioritize trees into the overall vision for their community.

Despite these identified shortcoming in current programs, many jurisdictions throughout the Portland-Vancouver region are prioritizing urban forestry activities into future community actions. Increasing community education on the benefits of the urban forest, the creation or revision of an urban forest management plan, and the establishment or revision of tree-related ordinances were indicated as high priorities by community officials and program managers in city governments. Counties also reported that establishing or working towards tree canopy goals was of precedence in urban service areas.

The findings of recent program assessments conducted in the Portland-Vancouver region present a telling story of current urban forestry management activity. While policies and programs may vary with respect to the applicability, strength, and enforcement of regulatory elements, the level of public investment, and extent of programs for tree preservation and planting among jurisdictions, there is growing consensus about the direction that should be taken regarding the management of the urban forest. Community officials and program managers alike recognize the importance of urban tree programs and have made progress in achieving program services related to tree health and diversity and maintaining valued ecosystem services.

Although these focal areas are important to maintaining an attractive, functioning urban forest, additional components important to the long-term, sustainable management of the resource are less prevalent in the Portland-Vancouver region. These items, such as urban forest management plan, a tree board or commission, and dedicated program funding, provide jurisdictions with more comprehensive or adaptive management strategies to support and sustain urban forestry efforts. National urban forest experts recommend that programs include elements related to the vegetative resource, a community framework, and resource management in order to encompass a wider array of management considerations, particularly social policies and programs. These social, political, and biological concerns must be jointly addressed to sustain urban forest health and structure.

The reported obstacles to urban forest management also parallel the need for more comprehensive and adaptive management structures within the Portland-Vancouver region. The identified need for increased political support, community involvement, and sustained funding sources, relate to an underlying necessity for more coordinated management activities. Coordinated planning and management activities are those that encourage program sustainability and advocate for the broadening of strategies from simply maintaining forest structure to a community wide effort (Dwyer et al. 2003). Such efforts include the exchange of information, prioritizing of benefits, designing management objectives, coordinating management activities, reviewing outcomes, and evaluating progress (Dwyer et al. 2003). Program components such as an urban forest management plan and a tree board or commission offer avenues in which these strategies can be met, and, if such strategies are successfully implemented, should result in more active political and community support and funding sources.

Furthermore, increased efforts should take place to raise the importance of the health and sustainability of the forest resource to the broader community in the Portland-Vancouver region. Participants from around the region reported on the theme of community involvement throughout the recent research studies, indicating that policies and program varied significantly in relationship to the level of citizen involvement and public and private partnerships. A key element of managing the urban forest in a regional context is the coordination of activities among different owners and stakeholders across jurisdictions (Dwyer et al. 2003). The public is perhaps the largest owner of the urban forest, with the majority of urban trees located on private property. Strategies to address this community stewardship can be obtained through coordinated management activities that identify common interests and resolve potential problems between the public's relationships with urban trees and the priorities of the local jurisdictions. By increasing educational efforts and opportunities for the public to engage with the urban forest, jurisdictions in the Portland-Vancouver region can further increase the success of local and regional urban forestry efforts.

In addition to its local applicability, this information presents an opportunity for state and national urban and community forestry programs to offer assistance to communities in the Portland-Vancouver region. State urban forestry program, under guidance from the U.S. Forest Service, track the number of communities in each state that have adopted practices to protect and manage their forests whether by staffing, laws, plans, advocacy groups, or inventories through the Community Accomplishment and Reporting System (CARS) (Nowak et al. 2010; USDA Forest Service 2006). The CARS dataset also serves as a measure of sustainability, because if communities are doing such activities, their forests are more likely to be sustained. Although disparities have existed between these practices and their implementation in the Portland-Vancouver region, this information can be capitalized by assistance programs to provide jurisdictions with tools and resources to more successfully implement or expand such services. Developing and expanding these program components and services within communities will further promote the concept of more coordinated management activities within the region while encouraging the creation of healthy, vibrant urban forests for current and future generations.

RECOMMENDATIONS

Results of region wide urban forestry assessments provide critical information for guiding comprehensive and adaptive management strategies for the Portland-Vancouver metropolitan region. Specifically, this research has identified three action priorities for the region:

1. **Create and distribute targeted messaging about the ecological, social, and economic benefits and services of the urban forest.** There is a consistent need for increased political and public support surrounding urban forest management in the Portland-Vancouver region. However, given the range of benefits provided by urban trees and the distinct differences between audiences including community officials and general public, no “single message” will resonate across the board. Messaging must therefore be clear and compelling to individuals and jurisdictions and be specifically targeted to each audience individually, appealing to the social and political context in which they operate.
2. **Establish comprehensive and adaptive urban forest management tools that provide long-term support for the urban forest.** Whereas current management efforts tend to focus on sustaining a healthy tree population, a broader, more comprehensive management approach is needed. Cities and counties should be encouraged to develop and implement criteria necessary for sustainable resource management including a comprehensive management plan, program funding, assessment tools, and an advisory organization such as a tree board. These tools and services can be developed in addition to more specific policy vehicles to ensure a

sustainable urban forestry program that is created and maintained through a shared vision with programs that are on-going and responsive. State and national programs as well as urban forest researchers have provided several models for sustainable program management including CARS. Such models should be adapted for local jurisdictions and tools and resources provided to them to better to accomplish these comprehensive management frameworks.

3. **Structure an outreach model that connects urban forestry with the broader interests and objectives of the community.** Results from recent research efforts throughout the Portland-Vancouver region have confirmed the need to align urban forest management within the broader community framework, considering the needs of the local population and its regional context. Given the diversity of the forest resource and the breadth of connections that can be made to urban trees, urban forest and natural resource managers and professionals should widen the scope of their focus to make broader community connections. These connections could include linkages to sectors such as health and youth engagement. Managers should consider the needs and attitudes of their community and structure management approaches as necessary to best address these needs, following local leadership and energy. Management activities should also be reassessed periodically to ensure the planning efforts remain relevant and align with current community objectives.

So how can these recommendations be successfully implemented throughout the Portland-Vancouver region? Feedback and reflection from our two-year regional urban forestry project has revealed that these recommendations can only be met by broadening our traditional urban forestry focus to include a variety of audiences who all hold a vested interest in building healthy, sustainable communities. To achieve the recommendations, we, as a region, must continue to building collaborative partnerships and establishing a collective vision for future action. Given the geographic diversity of the Portland-Vancouver region, there is a need for an organization framework that works between sectors of local governments and also across jurisdictional boundaries to achieve sustainable urban forest management.

The Collective Impact Model offers the ideal framework in which to achieve these recommendations. This approach is centered on the commitment of a group of important partners to a common agenda for solving common problems as shared measurement, continuous communication, and mutually reinforcing activities among all participants (Kania and Kramer 2011). The Collective Impact approach was the focus for the Regional Urban Forestry Strategy and will be referenced throughout the rest of this plan.

STRATEGY

Following is work completed, and next steps, to follow up on the recommendations made in the previous chapter.

CREATE AND DISTRIBUTE TARGETED MESSAGING ABOUT THE ECOLOGICAL, SOCIAL, AND ECONOMIC BENEFITS AND SERVICES OF THE URBAN FOREST

Policymaker Engagement

Make a more compelling case for investments in urban forestry.

As part of this project The Intertwine Alliance developed and published *Our Common Ground*, the case for investment in urban forestry and ecosystem services. *Our Common Ground* models a new approach to communicating about the complex topic of natural systems in the metropolitan environment. It provides engaging narratives from local projects mixed with data and infographics, presented in a graphically engaging style. In order to appeal to a broad audience, the report considers the ways in which investments in nature yield multiple community benefits. The final page of the report issues three challenges to the region's leaders: to increase the amount of water managed by natural systems; to increase tree canopy; and to put in place a permanent source of support for managing natural area land. About two dozen elected leaders have pledged to help meet these challenges.



Next Steps: The Alliance is now working to develop a second Common Ground Report, which will lay out a vision for the region's natural systems, and continue to build and document the case for investment.

We are also working with management agencies across the region to identify metrics that are of shared interest so that we have ongoing information about the state and condition of natural areas and urban forests.

The Alliance is working to build grassroots capacity to support urban forestry policies and programs. This is being accomplished through county level forums that bring community leaders together to connect and align themselves.

Public Engagement

Provide a fresh and more engaging approach to public engagement that can be adopted and adapted across the metropolitan region and throughout the US.

Our Common Ground Campaign



The Alliance developed the Our Common Ground Campaign, which uses “spokespecies” to communicate perspectives on the value of nature in the metropolitan area. The campaign takes a playful approach to engaging residents. As part of the campaign, The Alliance is now developing a mobile app, and envisions a video series, outdoor advertising and other strategies.

Next Step: The Alliance is developing a mobile app, called “Daycation,” to be released this summer, that will engage residents with nature in the region. The app will teach residents about native plants and animals, including tree species, encourage residents to take pictures of native plants and animals, to upload photos to The Alliance website, and to volunteer for stewardship projects in the community.



The Our Common Ground Campaign is used to promote the “Plant Off” youth planting events.

ESTABLISH COMPREHENSIVE AND ADAPTIVE URBAN FOREST MANAGEMENT TOOLS THAT PROVIDE LONG-TERM SUPPORT FOR THE URBAN FOREST.

Urban Forestry Management Cohort

Create a cohort of cities that work together to improve or develop urban forestry management

Urban Forestry forums conducted through this project indicated a high level of interest in exchanging best practices and discussing challenges related to the development and implementation of tree policies and management practices. Municipal staff and organizational leaders found that they have much they can learn from each other.

Next Step: Put together a working group of staff from cities that want to improve their tree policies and management plans. Establish and manage an ongoing peer-to-peer exchange.

Urban Forestry Forums

Convene two forums per year for urban forestry practitioners to exchange best practices.

Forums created through this project for the exchange of best practices among urban forestry practitioners and civic leaders were successful. We plan to continue them.

Next Step: The Urban Forestry Management Cohort is a laboratory to explore issues. We will use the cohort to identify those issues that may have interest to broader audiences through urban forestry forums. Forums will last 3 to 4 hours and we expect 75 to 100 attendees per forum. We will also create a web portal and listserv to support the forums.

STRUCTURE AN OUTREACH MODEL THAT CONNECTS URBAN FORESTRY WITH THE BROADER INTERESTS AND OBJECTIVES OF THE COMMUNITY.

Health and Nature Initiative

Create a health argument for urban forestry; attract health sector investment; demonstrate how the Collective Impact model can apply to urban forestry

There is a mounting body of research demonstrating the health benefits of nature, but very little work looking at how this connection should be translated into community planning, policy and investment. Health and environmental professionals have frequently operated from different frameworks. The healthcare community has focused on treating the symptoms of disease, often with less attention to root causes. Conservationists have focused on environmental health, often with less attention to human health.



Intertwine Forum on Health and Nature, Fall 2014

Recent developments have generated interest in both the health and environmental community for exploration and closer collaboration. One manifestation of this is the strong health sector interest and participation in The Intertwine Alliance. The potential for relevant, productive collaboration is now both possible and timely. Over the last year, organizations like the Willamette Partnership, Pinchot Institute for Conservation, Portland State University, Yale University, and others have been exploring how to better link investments in nature and health. The Portland region is known nationally as an innovator

in the way it invests in nature. Oregon is known nationally as a health innovator. This project connects the two in ways that advance support for urban forestry.

We have established an ongoing, diverse, interdisciplinary working group of organizational leaders to direct the effort. We've created forums to highlight important research and a dialogue about how to bring this research into community planning, policy and investment.

Next Step: Identify and implement pilot projects that demonstrate the connection between investments in urban trees and community health. We are currently reaching out to public and private health organizations to identify projects.

In the future, we will work towards identifying one or more shared outcomes to achieve through our collective impact approach with associated metrics; establishing ongoing alignment and communications among the partners; and working to impact local planning, policy and investment decisions as they influence community health and urban forestry.

Ecosystem Services Initiative

Implement projects that demonstrate how tree planting, wetland restoration, and natural areas can be used to cool and manage water for growing metropolitan areas.

Trees can not only help make money, but save money, too. Urban forests are a form of green infrastructure, or an interconnected network of natural areas and features that provide essential environmental functions. As such, trees reduce the necessary size and costs of conventional infrastructure, such as stormwater pipes and ponds, by soaking up and storing water run-off in their leaves, trunks and root systems. Trees help cool rivers and streams and manage storm water, both services that government agencies in our region must provide. A primary element of our region's urban forestry strategy has been to encourage the planting of trees to provide these services (green infrastructure) rather than accomplish these objectives through engineered approaches (gray infrastructure).

Next Step: Develop a "business case" for an ecosystem services approach to a large landscape or watershed within the region that would encourage a shift from gray infrastructure to green. Work to align local governments, parks agencies, water utilities and others behind the strategy.



Preparation for a "Plant Off" tree planting event. Two teams of youth worked with Alliance partners to plan, promote, and lead a tree planting event in their communities.

Youth Engagement with Urban Forestry

Engage youth in helping expand and restore the region's urban forests

The previous section of this report noted that it is important to expand the relevancy of urban forestry to new audiences, including youth. This project created a pilot program, called “Plant Off,” to engage youth teams in planning, promoting and leading tree planting events in their neighborhoods. With the support of ten different public, private and nonprofit organizations, two teams of racially diverse youth organized, promoted and led tree planting events in their communities. The youth participated in a series of workshops where they learned the importance of trees to watersheds, developed a plan for their planting sites, worked with a marketing and public relations firm to produce and implement an advertising campaign, served as leaders of the planting events, and then reported their results at a conference of more than 200 conservation leaders. The events helped kick off a campaign called “Tree for All” that will plant 1 million trees in a year. As part of this project, more than 16,000 trees were planted on almost 12 acres. The youth were able to attract a much more diverse group of participants than similar events in the past and for many participants this was their first conservation-oriented event ever.

Next Step: We plan to use the “Plant Off” piloted through this project in other aspects of the implementation of this strategy. The most immediate opportunity is to engage youth teams in the testing and launch of the Daycation app, described above.

CONCLUSION

Urban forests—and urban forestry—can play a key role in addressing some of the central challenges facing urban regions, such as climate change, education and youth engagement, the rising costs for health care, and wastewater management. Addressing these issues requires new partnerships and new approaches. The opportunity is to substantially broaden the constituency for and relevancy of urban forestry and elevate it in the eyes of policymakers and the public.

Whether through developing a new way to discuss these issues through storytelling, to developing tools that allow practitioners to better assess, plan, implement and monitor their work, to co-convening with new industry partners such as the health sector – the strategies presented in this report break down the siloes that limit effectiveness. Trees in our urban sphere should not be approached as a special interest of urban foresters and conservationists. They are central to a range of systems and social conditions, and ultimately the health of our communities and strategies to improve the health of urban forests must be rooted in broad collaborations of diverse community partners.

The strategies presented here, as with any community engagement effort, require long-term commitment. However, they also bring new constituencies to the table, which vitalize the effort and sustain it into the future.

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(Add FSG article on CI?)

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This project is an integral part of a broader community vision. Learn more at www.theintertwine.org

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