From Backyards to Benefits

Economic Values Supported by the Backyard Habitat Certification Program

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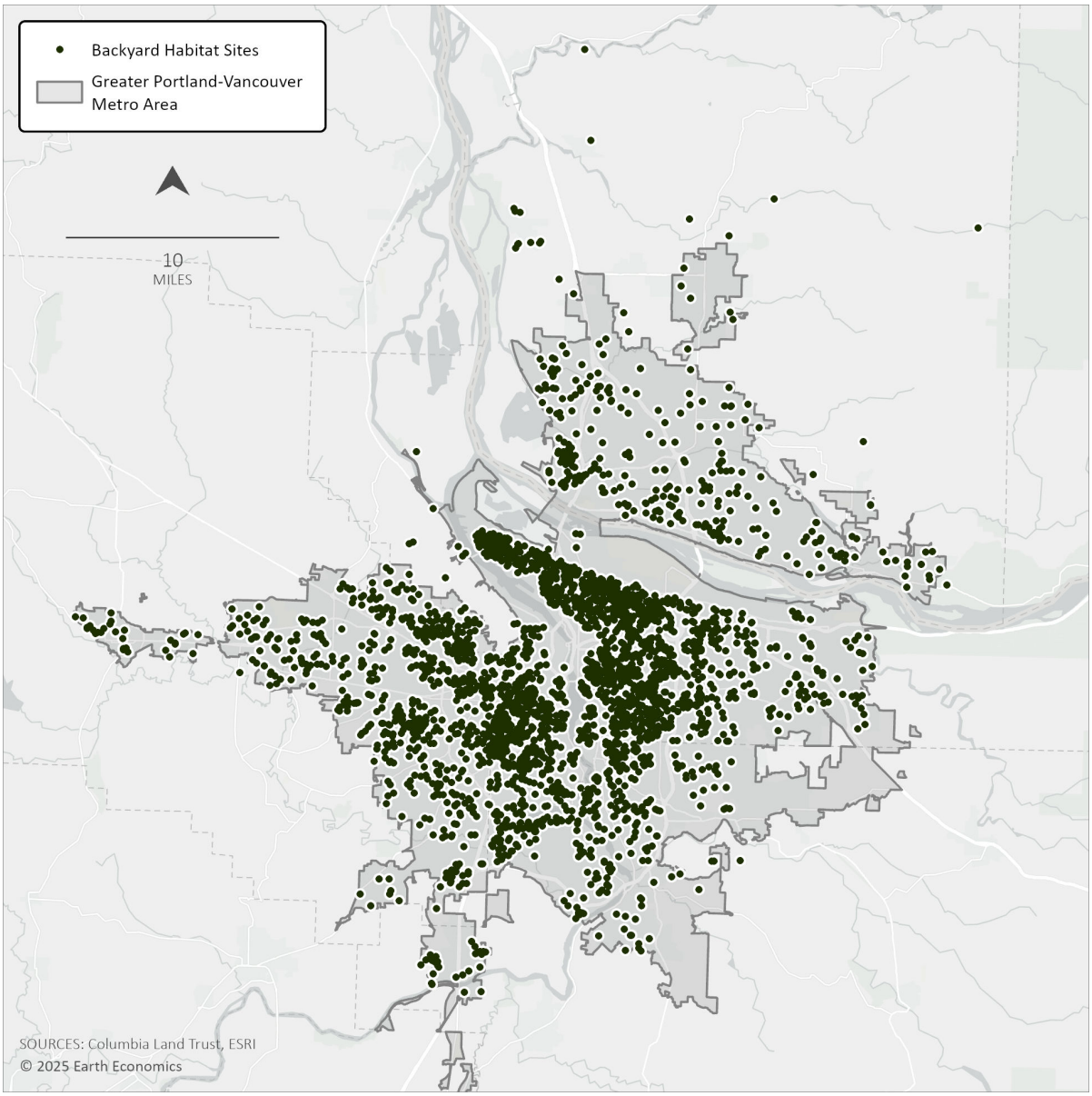
Earth Economics acknowledges that we operate on the lands of the Coast Salish peoples, specifically the ancestral homelands of the Puyallup Tribe of Indians, and the 1854 Medicine Creek Treaty.

About the Backyard Habitat Certification Program

Columbia Land Trust and Bird Alliance of Oregon offer a unique program that supports the creation and expansion of urban natural habitats in the Portland-Vancouver metropolitan area. Participants work to transform yards or community sites into habitat that benefits pollinators and local wildlife and provides myriad other benefits. As of 2025, over 12,000 sites across the region participated in the program. The majority of these sites are residential properties, but schools, religious institutions, and other community sites also participate—this amounts to roughly 1 percent of all households across the metro area.

Figure 1. Map of sites participating in the Backyard Habitat Certification Program as of 2025



Why Nature in Our Backyards Matters

Greening urban spaces and reestablishing native plants in backyards and schoolyards provides social, environmental, and economic benefits received by homeowners, community members, and school communities. Greening these spaces creates more resilient homes, neighborhoods, and schools, improving the local quality of life. However, the value of these benefits are often overlooked, as they are provided freely by nature. Estimating the dollar value of the ecosystem services produced by urban greening offers an apples-to-apples comparisons to conventional economic benefits, enabling more-informed decision-making.

This report aims to quantify the economic value of benefits provided by the *Backyard Habitat Certification Program (BHC)*, with a focus on the ability of these projects to improve air and water quality, regulate climate, improve human health, and boost the local economy.

Including the economic value of benefits that people receive from nature leads to stronger, more informed decision-making. Because these benefits have often been excluded from accounting frameworks, they have effectively been considered to have zero value—resulting in incomplete assessments of their true worth. Ignoring these values can lead to inefficient investments, higher long-term costs, and misguided asset management. Where natural systems are degraded, communities become more vulnerable to flooding and other disasters, and taxpayers must often pay to replace lost services, such as water filtration, with other expensive built infrastructure. In many cases, the benefits we receive from nature are irreplaceable. Recognizing and quantifying these benefits is now a common and necessary practice for evaluating environmental programs like BHC, ensuring that decision-makers account for the full range of values green communities provide.

Environmental Benefits of Green Spaces

The BHC Program focuses on native plants that occur naturally in the Portland-Vancouver region. Because they have co-evolved together, native plants tend to be critical for insects, birds, and other wildlife. Over ninety percent of plant-eating insects eat or lay eggs on specific plant species, making native plants essential to their survival. In turn, these insects are a source of food for local bird populations. By establishing native plants, we provide critical habitat that can be scarce in urban settings.

Greening urban landscapes provide a host of additional environmental benefits. Because native plants are adapted to local climates, they require less water and maintenance once established. Plants clean the air, capturing pollutants and particulate matter in their leaves; their root systems can improve water quality by absorbing and metabolizing other pollutants. Shading from trees help to keep neighborhoods cooler, while sequestering carbon to help regulate the global climate. As a whole, these benefits are known as *ecosystem services.*

Ecosystem Services: The Benefits Nature Provides

We can think of nature as a type of capital—natural capital, which provides us wealth in the form of goods and services, or *ecosystem services*. Plants, trees, rivers, ponds, and other natural features provide a foundation for all human societies, yet this role is frequently overlooked (see Figure 2). **Simply put, ecosystem services are the benefits people receive from nature.**

Figure 2: Natural Capital, Ecosystem Function, and Ecosystem Goods and Services

Ecosystem services can be categorized into four broad groups:

- ***Provisioning services*** are materials or energy outputs, such as crops and fresh water supply.
- ***Regulating services*** are natural functions that influence natural phenomena, such as cleaning air and water, preventing soil erosion, and mitigating risk of natural disasters.
- ***Supporting services*** characterize the habitat of plants and wildlife throughout their lifecycles and support all other ecosystem services.
- ***Information services*** are associated with the meaningful interactions between humans and nature, including aesthetic experiences, recreation, support of science and education, and spiritual and cultural enrichment.

Valuing Nature's Benefits

Economic value (also referred to as *utility*) is a measure of the overall benefit provided by a good or service. This is not necessarily the same as a *market price* or market value, though goods and services are often valued this way. Rather, economic value describes *innate worth* to people. As with conventional goods and services, there are many ways to estimate the value of ecosystem services.

Some ecosystem services are traded directly in markets and thus have *market value* (e.g., crops, timber). Estimating their value can be rather simple. However, many ecosystem services are not directly traded, even though their value may be widely acknowledged. These are known as *non-market benefits*, and because they are not bought or sold directly, their economic value must be estimated by other means. Most non-market valuation methods are based on either *stated preferences* or *revealed preferences*. Stated preference methods estimate value by asking people what they would be willing to pay for a particular resource (or accept for its loss). Revealed preference methods infer values by observing spending in related markets, such as the cost of traveling to experience specific natural features.

Another category of approaches for estimating the economic values of ecosystem services is known as *Benefit Transfer Methods* (BTM), broadly defined as generalizing data from settings where it was originally collected (Johnston et al., 2015) to new "transfer sites." Best practices for the application of BTM ensure that transfer sites share ecological and social characteristics. One common form of BTM is property appraisal, in which recent sales of nearby homes sharing similar features (e.g., two bedrooms, garage, one acre, recently remodeled) are used to estimate the value of off-market homes. BTM is often the most pragmatic option for quickly generating reasonable estimates at-scale and at a fraction of the cost of conducting multiple primary studies.

Earth Economics used BTM to estimate the ecosystem service contributions of the BHC Program for this report, identifying published ecosystem service valuation estimates from comparable ecosystems in the Pacific Northwest and "transferred" them to program locations in the Portland-Vancouver metro area.

Benefits Provided by the Backyard Habitat Certification Program

As of 2025, more than 12,000 program participants have planted over 900 acres of native trees, shrubs, and groundcover plants across the Portland-Vancouver metropolitan area. Earth Economics has estimated that the total economic value of ecosystem services provided by program participants is over $5 million per year (Table 1).

This represents the value of services people receive freely from the native plants grown by program participants. These values reflect improvements to community health and wellbeing associated with the program. The following sections describe the ecosystem services included in these results.

Table 1. Annual ecosystem service benefits provided by county

County	Benefits (2024 USD/year)	Area Planted (Aces)
Oregon	**$4,705,000**	**803**
Clackamas	$386,000	152
Multnomah	$2,977,000	414
Washington	$1,342,000	237
Washington	**$330,000**	**119**
Clark	$330,000	119
Total	**$5,034,000**	**923**

Aesthetic beauty

Greener areas are beautiful and enjoyable to live in. Homes near green spaces often have higher value because people enjoy the views and peaceful surroundings. *Native plantings by the program provide $3.9 million in aesthetic benefits every year.*

Habitat

Native plants are essential for sustaining local insect and wildlife populations. Even those people who will never see these animals place value on the knowledge that these species have their homes protected for the future. *The program provides $145,000 in habitat benefits each year.*

Noise Reduction

Trees and shrubs can act as natural sound diffusers, softening noise from traffic, neighbors, and other urban sources. By planting native vegetation, participants help create quieter, more peaceful neighborhoods. *Participants provide $408,000 in noise reduction benefits each year by planting native plants on their properties.*

Stormwater Management

Vegetation absorbs rain and stormwater, reducing urban flooding and stormwater management demand, saving costs and emissions by reducing pumping and water treatment. *Planting done with the program provides $292,000 in stormwater regulation benefits each year.*

Carbon Sequestration

Plants capture and store carbon, helping to limit the impacts of climate change, such as damage to crops, infrastructure, and human health. *Native plants established by the program provide $57,000 in carbon sequestration benefits each year.*

Air Quality Improvement

Trees and shrubs capture air pollutants such as particulate matter and ozone, reducing respiratory illness rates. *Plants planted by program participants provide $48,000 in air quality benefits annually.*

Temperature Regulation

Trees provide shade and evapotranspiration, regulating local temperatures and reducing heat extremes. In turn, we spend less to cool our homes, while also benefiting from reduced risk of heat-related illnesses and injury. *The Program provides $148,000 each year in temperature regulating benefits.*

Supporting Mental Wellbeing

A growing body of research has demonstrated that gardening can improve mental health and wellbeing. Gardening has been associated with measurable reductions in stress, anxiety, and depression, as well as enhanced life satisfaction and overall quality of life. A global meta-analysis conducted by Soga et al. (2017) synthesized multiple studies between control and treatment groups, examining the effects of gardening and horticultural therapy on a range of health outcomes. Their analysis identified that participation in gardening in consistently linked to better psychological outcomes.

The present analysis estimates the likelihood that participants in the BHC Program would experience depression or anxiety based on effect sizes reported in Soga et al. (2017). Building on a framework described by Borenstein et al. (2009), the effect sizes were converted into risk ratios to allow comparisons of the relative likelihood that participants and nonparticipants would experience anxiety or depression. These ratios were applied to Oregon's baseline prevalence of anxiety and depression (the proportion of adults experiencing these conditions) to estimate changes owing to the mental health benefits of gardening (National Center for Health Statistics, 2025). Differences between baseline and adjusted prevalence represents the reduction in risk that a person may experience anxiety or depression, owing to participation in program activities.

Because anxiety and depression often occur together, this analysis averaged reductions across both conditions as a representation of the overall mental health benefits of gardening. This ensures that benefits are not counted twice where individuals experience both conditions. This average reduction, representing less anxiety or depression as a result of gardening, was then used to estimate the economic value of improved mental health.

Two studies provide a basis for the costs associated with anxiety (Shirneshan, 2013) and depression (Greenberg et al., 2021). These included both direct costs (e.g., medical treatment, medication) and indirect costs (e.g., lost productivity and reduced work performance). To avoid overstating benefits, the average annual cost associated with anxiety and depression was applied to the average reduction in prevalence. This calculation provides a conservative economic estimate of the costs of anxiety and depression avoided by those who participate in the gardening activities of the BHC Program.

Table 2. Annual mental health benefits from the BHC program (2024$)

Mental Health Impact	Benefit
Individuals with reduced risk of depression or anxiety	289
Estimated avoided direct healthcare costs (total costs)	$687,000
Estimated avoided indirect costs (total costs)	$814,000
Total estimated avoided costs	**$1,501,000**

Applying the modeled reductions to the BHC Program shows that it produces a meaningful mental health benefits—an estimated 289 individuals have a lowered risk of experiencing these mental health conditions. Reducing this risk translates into measurable economic value. Using an average annual cost of anxiety and depression, the analysis estimates that the BHC Program helps avoid approximately $687 thousand in direct healthcare expenses each year (2024$). These include costs related to treatment, medication and other medical services. In addition, participants are expected to avoid roughly $814 thousand in indirect costs, such as lost productivity or missed workdays.

Overall, reduced anxiety or depression among gardening participants results in an estimated $1.5 million in avoided costs each year. These findings indicate that the BHC Programs provides substantial economic value and supports broader community wellbeing by facilitating activities that promote healthier, more resilient outcomes for participants.

Strengthening Local Economies

Spending related to the planning, construction, operation, and maintenance of the BHC program generates local and regional economic activity in terms of sales and jobs. During each phase of the project, participants must purchase materials, hire labor, and rent equipment, directly supporting local and regional businesses.

To understand how spending on the BHC program affects the Oregon economy, Earth Economics conducted an economic impact analysis using the industry-standard IMPLAN input-output software (IMPLAN Group LLC, 2025). Economic impact analyses estimate how spending in one sector—such as urban greening programs—circulates to other sectors, through interconnected supply chains and household spending. Money invested in urban greening projects ripples throughout the economy, creating a chain of economic benefits that extend beyond the program itself. Participants buy materials (e.g., plants, soil, tools) at local nurseries and gardening stores. These merchants then purchase supplies from farms or manufacturers. Employees at all of these businesses also spend their wages in local communities to sustain themselves and their families.

These "ripple effects" are captured through three types of effects:

- ***direct effects***—immediate spending on urban greening projects at nurseries and gardening stores;
- ***indirect effects***—business-to-business purchases (wholesalers and suppliers of trees, plants and equipment); and
- ***induced effects***—household spending by workers in all of these industries.

Collectively, these factors produce economic impacts of initial spending across several economic indicators:

- ***output*** is known as the overall value of goods and services generated;
- ***value added*** to Gross Domestic Product represents the net contribution to Oregon's economy after accounting for intermediate inputs;
- ***employment*** counts the number of full-, part-time, and seasonal positions supported by project spending;
- ***labor income*** are the wages earned by workers in affected industries; and
- ***tax revenues*** at the local, state, and federal level, as generated by direct, indirect, and induced spending.

When combined, these effects and indicators form a comprehensive picture of the impact spending can have on the region's economy.

The IMPLAN analysis shows that BHC-related spending supports 21 jobs—this includes direct jobs at nurseries, gardening stores and local contractors, as well as additional positions supported through business-to-business spending and household spending by workers. In total, these jobs generate approximately $1.16 million in annual income for workers. In terms of broader economic activity, the program contributes nearly $2 million to Oregon's GDP and generates more than $3 million in total economic output (which represents the total sales or expenditures generated from the initial spending). This reflects the value of all goods and services produced as a result of BHC-related spending, including those "ripple effects" described previously. The program also produces tax revenue along multiple levels of government. Economic activity from the BHC generates an estimated $435 thousand in combined

local, county, state and federal tax revenues. These funds help support public services and infrastructure across the region.

Table 3. Annual Economic Impacts of CLT's Backyard Habitat Certification program investments (2024$)

Effect Type	Jobs	Labor Income	Value Added to GDP	Output
Direct	15	$760,000	$1,274,000	$1,848,000
Indirect	2	$167,000	$273,000	$495,000
Induced	4	$233,000	$419,000	$664,000
Total	**21**	**$1,161,000**	**$1,967,000**	**$3,007,000**

Table 4. Annual Tax Revenue from CLT's Backyard Habitat Certification program investments (2024$)

Effect Type	Local Taxes	County Taxes	State Taxes	Federal Taxes	Total Taxes
Direct	$24,000	$6,000	$57,000	$184,000	$271,000
Indirect	$10,000	$2,000	$15,000	$39,000	$66,000
Induced	$15,000	$4,000	$22,000	$57,000	$97,000
Total	**$48,000**	**$12,000**	**$94,000**	**$281,000**	**$435,000**

HOW ONE BACKYARD CREATES A RIPPLE THROUGH THE ECONOMY

When BHC Program participant decides to upgrade their yard, they may visit a local nursery to purchase native plants, soil, and mulch. This ***direct*** spending supports the nursery and its employees. The nursery places restocking orders with local farms for native shrubs, trees and wildflowers, and those farms go on to buy additional supplies such as soil, pots, and irrigation materials from regional wholesalers. These business-to-business transactions represent the ***indirect*** effects of the participant's BHC project.

Landscapers, delivery drivers, and employees at the nursery and farms all earn wages that they spend in their communities to support themselves and their families—groceries, fuel, childcare, and other daily needs. This household spending reflects ***induced*** spending that continues to circulate throughout the Oregon economy. Those initial project investments create ripples in the local economy, supporting local businesses, sustaining jobs, and reinforcing the network of nurseries, growers, and suppliers that underpin the regional green economy sectors.

Bringing it all Together: The Value of Greener Backyards

Backyard greening offers far more than beautiful landscapes—it delivers measurable benefits to people, communities, and the environment. This report provides a snapshot of some of the benefits provided by the BHC Program, including the ecosystem services generated by native plants, the mental health improvements associated with gardening activities, and the positive economic impacts from local spending on habitat-friendly materials and services. Each tells part of the story, but together they provide a holistic view of the benefits of investing in nature.

Because the BHC Program continues to grow, these results reflect only a single moment in time. As more residents participate and more habitat is planted, the annual benefits will increase accordingly. At the same time, these values should be considered *underestimates*, limited by the available data and the published research assessing the economic benefits of nature. The benefits reported here are not exhaustive; additional benefits almost certainly exist.

Together, these findings show that small individual actions can add up to meaningful gains:

- $5 million each year in environmental benefits, including cleaner air and water; quiet, beautiful spaces for both people and wildlife to enjoy; and safer places to live and work through reduced risk from extreme heat and excess stormwater
- $1.5 million each year in mental health benefits associated with reduced symptoms of depression or anxiety
- 21 jobs supported at local businesses, generating $1.2 million in wages
- More than $3 million in local economic activity supported by program spending, along with hundreds of thousands of dollars in tax revenue

The BHC Program demonstrates that empowering people to restore nature at home is an effective, scalable way to support healthier and more resilient communities.

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Appendix A. Ecosystem Service Valuation Sources Used

Benefit	Site	Source
Aesthetic Beauty	Global	Bockarjova, M., Botzen, W. J. W., & Koetse, M. J. (2020). Economic valuation of green and blue nature in cities: A meta-analysis. *Ecological Economics*, *169*, 106480. https://doi.org/10.1016/j.ecolecon.2019.106480
Air Quality Improvement	Portland, OR	David Evans and Associates, Inc. & ECONorthwest. (2004). *Comparative Valuation of Ecosystem Services: Lents Project Case Study*. City of Portland Watershed Management Program.
	Oregon	Nowak, D. J., Hirabayashi, S., Bodine, A., & Greenfield, E. (2014). Tree and forest effects on air quality and human health in the United States. *Environmental Pollution*, *193*, 119–129.
	Portland, OR	Nowak, D. J., Crane, D. E., & Stevens, J. C. (2006). Air pollution removal by urban trees and shrubs in the United States. *Urban Forestry & Urban Greening*, *4*, 115–123. https://doi.org/10.1016/j.ufug.2006.01.007
	Corvallis, OR	Phillips, D., Burdick, C., Merja, B., Brown, N. (2011). *Assessment of Ecosystem Services Provided by Urban Trees: Public Lands Within the Urban Growth Boundary of Corvallis, Oregon*. U.S. Environmental Protection Agency.
	Portland, OR	DiSalvo, A., Fukuda, J., & Ramsey, J. (2017). *Street Tree Inventory Report: City of Portland* (No. ver. 4/14/2017; p. 43). Portland Parks & Recreation Urban Forestry.
	Oregon	Gopalakrishnan, V., Hirabayashi, S., Ziv, G., & Bakshi, B. R. (2018). Air quality and human health impacts of grasslands and shrublands in the United States. *Atmospheric Environment*, *182*, 193–199.
Carbon Sequestration	Global	Tol, R. S. J. (2023). Social cost of carbon estimates have increased over time. *Nature Climate Change, 13*(6), 532-536. https://doi.org/10.1038/s41558-023-01680-x
	Corvallis, OR	Phillips, D., Burdick, C., Merja, B., Brown, N. (2011). *Assessment of Ecosystem Services Provided by Urban Trees: Public Lands Within the Urban Growth Boundary of Corvallis, Oregon*. U.S. Environmental Protection Agency.
	Western Pacific Northwest	Hoover, C. M., Bagdon, B., & Gagnon, A. (2021). *Standard estimates of forest ecosystem carbon for forest types of the United States* (pp. 106–115) [General Technical Report]. U.S. Department of Agriculture, Forest Service, Northern Research Station. www.fs.usda.gov/research/treesearch/63638
Habitat	Seattle, WA	Clucas, B., Rabotyagov, S., & Marzluff, J. M. (2014). How much is that birdie in my backyard? A cross-continental economic valuation of native urban songbirds. *Urban Ecosystems*, *18*, 251–266. https://doi.org/10.1007/s11252-014-0392-x
	Global	Bockarjova, M., Botzen, W. J. W., & Koetse, M. J. (2020). Economic valuation of green and blue nature in cities: A meta-analysis. *Ecological Economics*, *169*, 106480. https://doi.org/10.1016/j.ecolecon.2019.106480
Noise Reduction	Global	Bockarjova, M., Botzen, W. J. W., & Koetse, M. J. (2020). Economic valuation of green and blue nature in cities: A meta-analysis. *Ecological Economics*, *169*, 106480. https://doi.org/10.1016/j.ecolecon.2019.106480

Benefit	Site	Source
Stormwater Management	Corvallis, OR	Phillips, D., Burdick, C., Merja, B., Brown, N. (2011). *Assessment of Ecosystem Services Provided by Urban Trees: Public Lands Within the Urban Growth Boundary of Corvallis, Oregon*. U.S. Environmental Protection Agency.
	Portland, OR	DiSalvo, A., Fukuda, J., Ramsey, J. (2017). *Street Tree Inventory Report: City of Portland*. Portland Parks & Recreation Urban Forestry.
	Lancaster, PA	CH2M Hill, Inc. (2011). *Green Infrastructure Plan*. The City of Lancaster. www.cityoflancasterpa.gov/wp-content/uploads/2014/01/cityoflancaster_giplan_fullreport_april2011_final_0.pdf
	USA	The Water Research Foundation [WRF]. (2020). *Urban Stormwater BMP Database* [Dataset]. https://bmpdatabase.org/urban
	New Jersey	New Jersey Department of Environmental Protection, Division of Water Quality. (2018). *Evaluating Green Infrastructure: A Combined Sewer Overflow Control Alternative for Long Term Control Plants*.
	Canada	Canadian Nursery Landscape Association. (2017). *Life Cycle Cost Analysis of Natural On-site Stormwater Management Methods* (p. 18).
	Milwaukee, WI	CH2M Hill, Inc. & CDM Smith. (2013). *Milwaukee Metropolitan Sewerage District Regional Green Infrastructure Plan* (p. 99). Milwaukee Metropolitan Sewerage District. www.mmsd.com/static/MMSDGIP_Final.pdf
	Denver, CO	Anderson, S., & Piza, H. (n.d.). *Ultra-Urban Green Infrastructure Guildelines*. The City and County of Denver Public Works. www.denvergov.org/files/assets/public/v/1/doti/documents/standards/pwes-013.0-ultra_urban_green_infrastructure_guide.pdf
	USA	US EPA, O. (2021, July 23). *Power Profiler* [Data and Tools]. www.epa.gov/egrid/power-profiler
Temperature Regulation	Corvallis, OR	Phillips, D., Burdick, C., Merja, B., Brown, N. (2011). *Assessment of Ecosystem Services Provided by Urban Trees: Public Lands Within the Urban Growth Boundary of Corvallis, Oregon*. U.S. Environmental Protection Agency.
	Portland, OR	DiSalvo, A., Fukuda, J., Ramsey, J. (2017). *Street Tree Inventory Report: City of Portland*. Portland Parks & Recreation Urban Forestry.
	USA	McDonald, R. I., Kroeger, T., Zhang, P., & Hamel, P. (2020). The Value of US Urban Tree Cover for Reducing Heat-Related Health Impacts and Electricity Consumption. *Ecosystems*, *23*(1), 137–150. https://doi.org/10.1007/s10021-019-00395-5
	Global	Bockarjova, M., Botzen, W. J. W., & Koetse, M. J. (2020). Economic valuation of green and blue nature in cities: A meta-analysis. *Ecological Economics*, *169*, 106480. https://doi.org/10.1016/j.ecolecon.2019.106480