



2014 RESEARCH ACCOMPLISHMENT REPORT



GREEN
CITIES
RESEARCH
ALLIANCE





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RESEARCH
ALLIANCE**

The Green Cities Research Alliance (GCRA) was initiated by the USDA Forest Service, Pacific Northwest Research Station in 2009 to build a program of social and biophysical research sciences on urban ecosystems in the Puget Sound region. Through an integrated social-ecological research program, GCRA meets the practical needs and concerns of organizations and agencies that links to investigations in other U.S. urban areas.

GCRA pairs scientists with practitioners and local decision makers to co-design and implement research and programming efforts that provide relevant and practical information.

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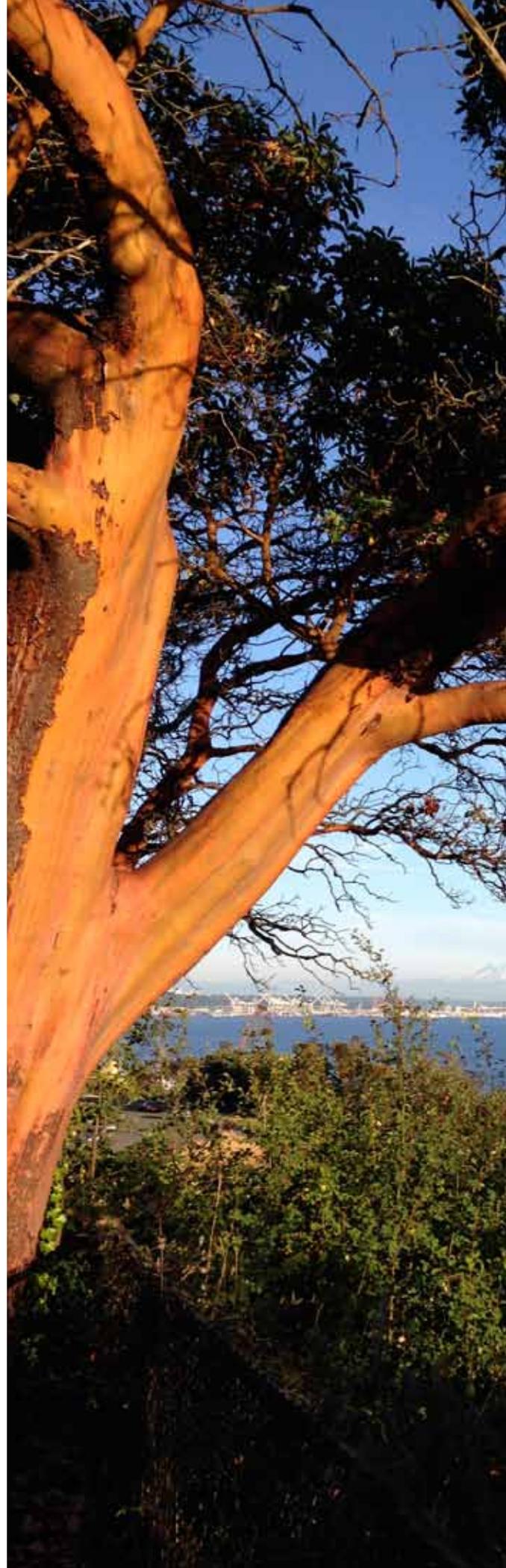
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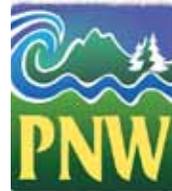
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CONTENTS

Green Cities Research Alliance.....	2
Accomplishments to Date.....	2
Recent Results.....	3
Applications and Outcomes.....	6
Green/Duwamish and Urban Waters....	8
Looking Forward.....	10
Publications and Presentations.....	12

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GREEN CITIES RESEARCH ALLIANCE: RESEARCH ON SUSTAINABLE CITIES THROUGH SCIENCE, POLICY, AND ACTION

The Green Cities Research Alliance (GCRA) focus has been to conduct practical, stakeholder-engaged research that provides immediate value and also lays the framework for future research. This report presents findings from the first five years of socio-ecological systems research in the Pacific Northwest.

Practical - Land managers have begun to incorporate new data sets, research findings, and evidence-based best practices into planning and operations. Applications include urban forest management plans, tools such as field guides, public engagement processes, and resources for landowners.

Efficient - The GCRA collaborative model has been extremely efficient. The return on investment from initial funding exceeded expectations, with dozens of publications and presentations, and widely applied results. Federal funds have been leveraged, producing a nearly 3 to 1 return rate.

Innovative - GCRA research uses new approaches. Based on the US Forest Service's *All Landscapes* focus, a coupled human-natural systems approach, and partnering scientists and practitioners to co-design and conduct science, GCRA delivers results in innovative ways.

ACCOMPLISHMENTS TO DATE

The number and quality of products produced are a strong indicator of success over the first five years of the GCRA. For a list, see the GCRA Publications and Presentations section at the end of this report.

46 Peer-Reviewed Publications

40+ Scientific and Academic Presentations

26 Professional Publications

75+ Professional Presentations



RESEARCH AND MANAGEMENT RESULTS

Research has been the central work of the Green Cities Research Alliance for the past five years. Science results and science delivery products directly translate to the needs of policy makers and managers. Research was conducted in the metro Seattle region, and across the Pacific Northwest.

ECOSYSTEM SERVICES

Knowledge about ecosystem services improves understanding of the structure, function, and value of King County's urban forest. i-Tree Eco data was collected for three project geographies - City of Seattle, the Green-Duwamish Watershed, and King County parks. This effort went beyond a traditional i-Tree study, exploring applicability of the tool in the Pacific Northwest. Study results and valuations are supporting the City of Seattle's Urban Forest Management Plan update, and will aid similar management at the watershed and county levels. Key results include: a structural value of \$4.9 billion for Seattle's trees; that Seattle's forest removes 725 metric tons of pollution from the environment every year, providing a pollution removal value of \$5.6 million annually; and that per acre, Seattle's urban forest stores 9.9 metric tons of carbon and sequesters 0.7 metric tons of carbon annually. This work is being presented in a technical report and in publicly accessible formats for land management. This data on the values of the natural environment establishes a strong baseline for studying urban natural resources.

LANDSCAPE ASSESSMENT AND RESTORATION

This project provided a comprehensive understanding of forest conditions that will inform long term strategic decisions. Through the development and implementation of a new rapid assessment technique, project partners for the first time captured data for 25,000 acres of King County parklands distributed across 150 sites. Park managers can now use the data for long term forest stewardship planning. In addition, these rapid forest assessment protocols are now available for use on other public lands. The assessment tools are being developed in conjunction with research results on stewardship activity and location to aid effective resource use. Subsequent work will develop an interactive directory of stewardship organizations, and aid other research using network analysis.

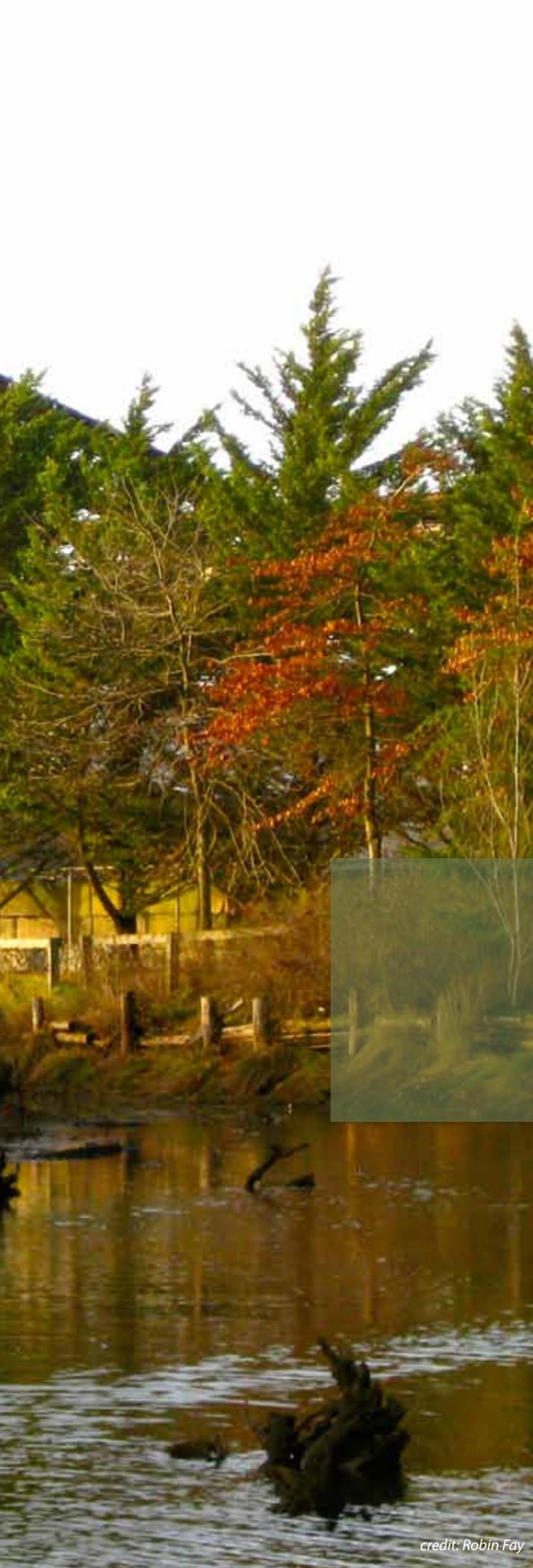
URBAN FOREST CANOPY ASSESSMENT NEW TOOLS FOR FOREST MANAGERS

The Remote Sensing and Geospatial Analysis Lab (RS-GAL) at the University of Washington provides research and technical support to the GCRA team. Research projects have focused on developing regional urban land use/land cover assessments, investigating uncertainty in urban canopy cover assessment, and assessing the urban food production potential for Seattle and surrounding areas. In addition, RSGAL created and maintains a web-based data portal that allows streamlined access to geospatial data relevant to GCRA's urban forest research. Trees provide many benefits to cities, but can compete with alternative horticultural land use applications such as urban agriculture. We are examining the impact of the urban forest and other land uses on the food production capacity of Seattle using remote sensing technology. In addition, we are delineating the area contiguous to Seattle required to provide the annual food needs of the population of the city.

STEWARDSHIP MOTIVATIONS, NETWORKS, AND MAPPING

Stewardship of urban natural resources is key to urban sustainability. Over 700 stewardship organizations have been identified and their missions, networks, and actions analyzed. Studies have also been completed about individuals' volunteer stewardship motivations, actions, satisfactions, and their commitment to organizations. Maps of the organizations' stewardships 'turfs' are part of a national website of similar effort in other major metropolitan areas.





COLLABORATIVE PARTNERSHIPS

Through collaboration, gains in efficiency and practicality can be achieved, making research more applicable and valuable. An evaluation of the Green Cities Research Alliance structure and process is underway to better understand why particular components of the Alliance have been successful, and to identify improvements. A review of existing collaborative research structures has shown that key operations and functions may result in more lasting and effective partnership.

URBAN FORAGING: EXPLORING THE USE OF NATURAL SYSTEMS FOR NON-MARKET VALUES

The research investigated the roles that non-timber forest products gathering, and stewardship practices play in the development and management of healthy forest ecosystems in Seattle. Seventy-six semi-structured interviews with 58 gatherers and 18 conservation leaders were conducted. More than 433 plant and 53 fungal species have socio-cultural value for foragers in Seattle. Gathering creates opportunities for people to become involved in stewarding plants, trees, and soils in our communities. Many foragers have detailed knowledge about urban green spaces and species, which could enhance understandings of ecological relationships and change.

ECONOMIC VALUATION OF VOLUNTEER STEWARDSHIP

Volunteer environmental stewardship represents a critical component of ecological restoration efforts. There are also substantial economic contributions that have gone unconsidered. Tools, time, and transportation are all donated to these events. Two tiers of consideration are being explored. The first are the contributions made by the volunteers themselves. The second are the contributions provided by volunteer event leaders or hosts, as well as sponsors. Results have produced academic and applied tools.

RESEARCH APPLICATIONS

Many of the studies conducted by the Green Cities Research Alliance are developed in partnership with resource planners and managers. Results are used by agencies and organizations. Presented here are a few examples.

KING COUNTY PARKS FOREST PLANNING

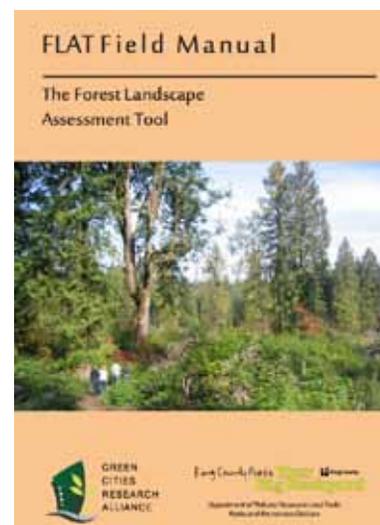
Project partners developed new rapid assessment technique, known as the Forest Landscape Assessment Tool (FLAT). Condition data for 25,000 acres of King County parklands, distributed across 150 sites, was collected for the first time. Park managers are now using the data for long term forest stewardship planning. Importantly, the forest assessment research and new database supported substantial increases in new forest stewardship funding for the County.

NATURAL AREA PARKS FOREST MANAGEMENT

GCRA research and the resulting applied tools are already being used in lands management. Rapid forest assessment protocols are now available and in use on many public lands. Additionally, the FLAT Guide has been developed for direct application of the research, and is in use in multiple communities across the region. This science delivery work example of the value of GCRA research for forest landscape management.

COST PER ACRE OF URBAN FOREST RESTORATION

With support from the USFS State and Private Forestry program, applied tools are being developed based on the cost estimation for volunteer led stewardship activities. The tool estimates costs for volunteer efforts which have traditionally been difficult to consider. Data from the Central Data Repository (CEDAR) used by the City of Seattle Parks and its partner land managers has been applied to this tool. It is streamlining processes for field data collection and delivering project outcomes and performance measures.



SEATTLE URBAN FOREST STEWARDSHIP PLAN



In 2013 the City of Seattle updated its urban forest management plan, moving to a stewardship-first approach. This new plan relied heavily on forest assessment and ecosystem service results from GCRA studies. Using this data, a clear description of the benefits of the urban forest led to management recommendations. The plan also calls for additional urban forest research, and highlights the applied value of the research.

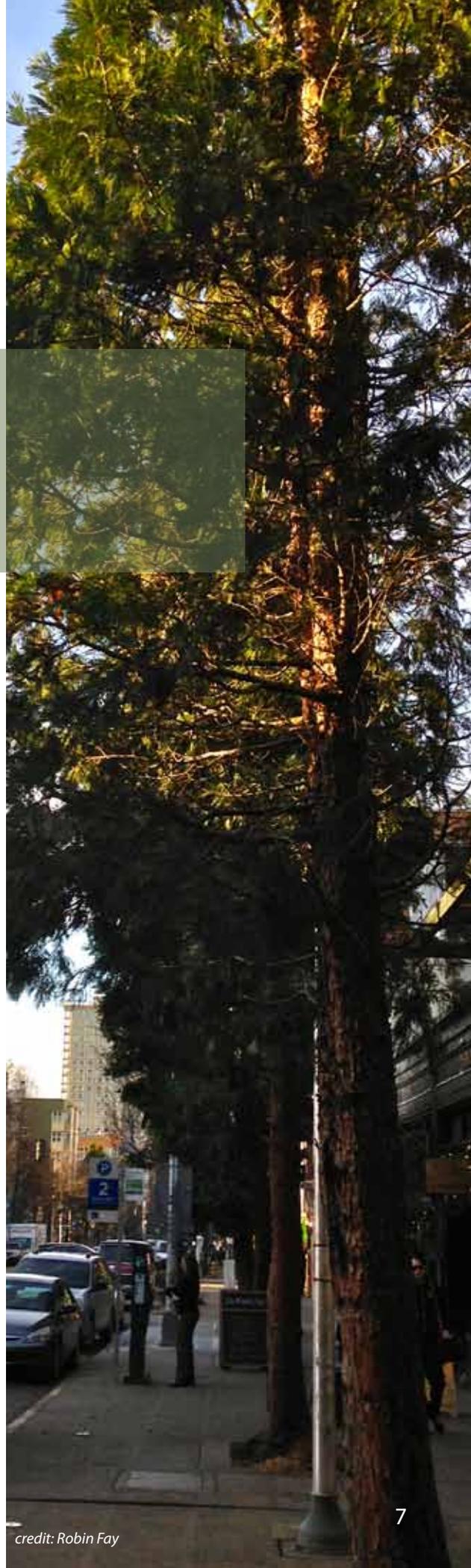
URBAN FORAGING RESEARCH INFORMS POLICY

Research findings about non-timber forest products, gathering, and stewardship practices has been integrated into the development and management of healthy forest ecosystems in and around Seattle. The outcomes of dozens of interviews with gatherers has informed local policies and organizations. City Fruit, a Seattle-based non-profit is one of many organizations using the research in improve their outreach and programing.

KING COUNTY CLIMATE PREPAREDNESS AND RESPONSE (CPR)



King County has implemented a new assessment tool for landowners using data and analysis developed through GCRA projects. This tool allows landowners to estimate ecosystem service values for climate mitigation and response for the trees and natural areas associated with their property. It helps landowners to make better long term decisions about their property.

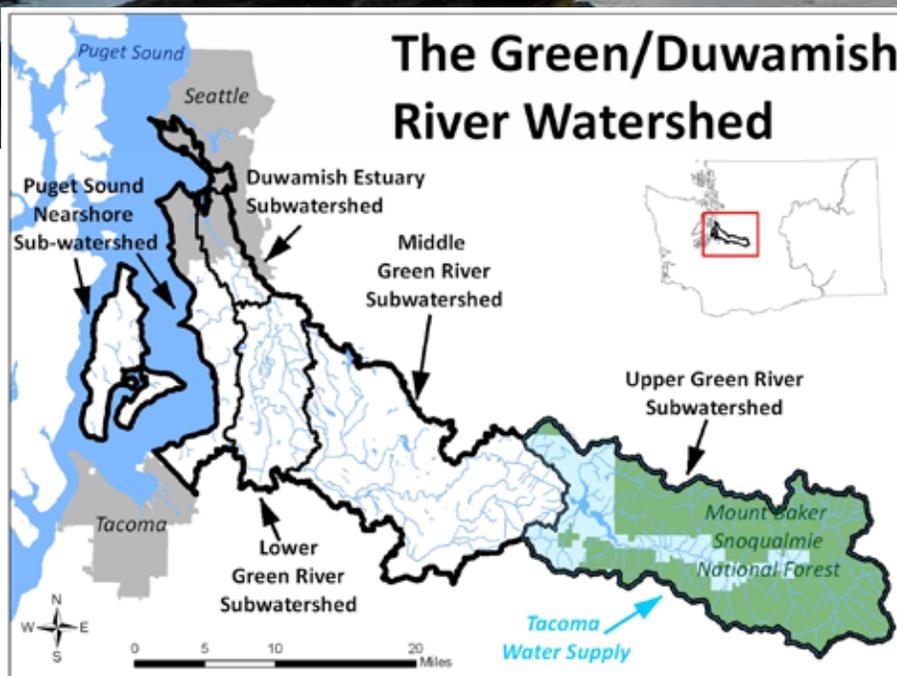
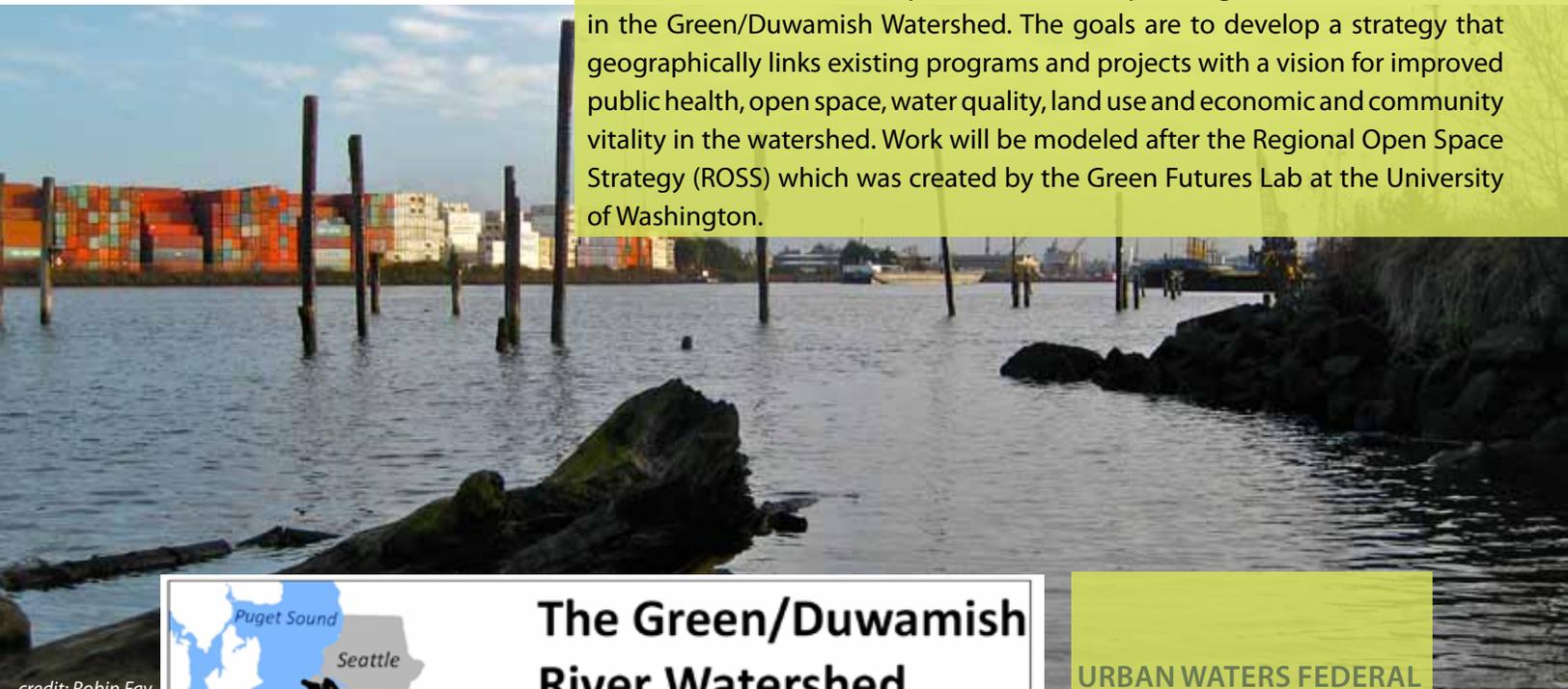


FOCUS: THE GREEN/DUWAMISH WATERSHED

The Green/Duwamish is a major river system in the Seattle metropolitan area. It represents the full landscape gradient from wildland forest to dense urban-industrial lands, and from the mountain peaks to the Puget Sound. The Green/Duwamish has been a major study site in the GCRA's forest assessment, ecosystem value studies, and surveys of stewardship activities research program. The watershed continues to be a major landscape of concern in the region. It presents both major human and ecological challenges, containing an EPA Superfund site, and communities experiencing serious economic and health risk. The GCRA is positioned well to continue to be a leader in research science in the watershed, particularly through coordination with the Urban Waters Federal Partnership.

GREEN/DUWAMISH WATERSHED STRATEGY

In 2014 King County, in collaboration with the City of Seattle and partners, announced a collaborative process to refocus planning and restoration efforts in the Green/Duwamish Watershed. The goals are to develop a strategy that geographically links existing programs and projects with a vision for improved public health, open space, water quality, land use and economic and community vitality in the watershed. Work will be modeled after the Regional Open Space Strategy (ROSS) which was created by the Green Futures Lab at the University of Washington.



URBAN WATERS FEDERAL PARTNERSHIP GOALS:

- Promote clean urban waters,
- Reconnect people to their waterways,
- Use urban water systems as a way to promote economic revitalization and prosperity,
- Encourage community improvements through active partnerships, and
- Focus on measuring results.

URBAN WATERS FEDERAL PARTNERSHIP

The Green-Duwamish was designated as the first Urban Waters Federal Partnership site in the Pacific Northwest. This developing national partnership among 12 Federal agencies is led locally by the USDA's Forest Service PNW Research Station. In close coordination with on-the-ground partners, the work addresses goals critical for urban waterways, including the whole river system from industrial urban core up to the National Forest. Goals of the Green-Duwamish partnership include: promote conservation, clean water, breakdown operating silos and encourage partnerships, reconnect people to their waterways, advance environmental justice, and create local economic benefits. The GCRA offers research and science to support the Urban Waters program.

RETURN ON INVESTMENT ANALYSIS

With combined support of GCRA and the Forest Service's PNW Station, Earth Economics conducted a cost-benefit analysis for estuary habitat on the Lower Duwamish. The benefits include 10 different ecosystem services such as salmon habitat, water filtration, flood mitigation, recreational fishing, and aesthetics.

MIDDLE GREEN RIVER: NATURAL CAPITAL INCENTIVES

This new research project will demonstrate how economic incentive programs may be used to encourage use of specific land management practices that produce positive ecological benefits for fish, while helping improve water quality by reducing water temperatures, sediments and nutrients. The project is being led by the Forest Service PNW Research Station in partnership with EPA, NRCS, and King County.

Green Cities
Research
Alliance

Urban Waters
Federal
Partnership

*Building a plan,
together*

As a key step in leading research in the Green-Duwamish watershed, the development of a synthesis plan is underway. This operating strategy will help align and leverage each of the research projects in the watershed through coordination with the Urban Waters Federal Partnership. The outcome will be a guiding document that will ensure efficient research undertakings with valued and applied results that inform each of the larger programs in the watershed as well.



credit: Duwamish River Cleanup Coalition

LOOKING FORWARD: HUMAN HEALTH AND WELLBEING

The GCRA has been focused not just on the impact people have on the environment, but the benefit that nature provides to people. Knowing more about the role of natural resources in public health and epidemiology is critical, as declining human health is an increasingly expensive public cost. PNW scientists are providing evidence that shows nature-based planning and design can promote health and prevent disease. This research is important to communities throughout the region and nation.

GREEN CITIES: GOOD HEALTH

Nearly 40 years of research shows that the experience of nature is profoundly important to human functioning, health, and well-being. Research has concluded that the natural environment in general, and trees specifically, can improve human well-being. Specific research investigations into this relationship have been completed, and a systematic review of the research to date is ongoing. The Green Cities: Good Health webpage funded by the Forest Service State and Private Forestry has identified over 3,000 scientific publications connecting human health benefits to urban trees and greening.

TREES AND HUMAN HEALTH: EVIDENCE FROM EMERALD ASH BORER

GCRA is also investigating the relationship between trees and human health outcomes. In one study there was an increase in mortality related to cardiovascular and lower-respiratory-tract illness in counties infested with the emerald ash borer. The magnitude of this effect was greater as infestation progressed, and in counties with above-average median household income. Across the 15 states in the study area, the borer was associated with an additional 6,113 deaths related to illness of the lower respiratory system, and 15,080 cardiovascular-related deaths.

GREEN STORMWATER INFRASTRUCTURE AND HUMAN HEALTH

King County, WA is investing heavily in green infrastructure approaches as one strategy to address a critical stormwater consent decree with the EPA. A multi-phased project will to measure human health outcomes associated with the implementation of green stormwater infrastructure. The project site is in the South Park neighborhood along the bank of the Duwamish River. A recent health impact assessment showed this neighborhood at high risk for adverse health outcomes, including a substantially shorter life-span.

METRO NATURE FOR HUMAN HEALTH AND WELLNESS

In the past 10 years the scientific evidence of the importance of urban nearby nature for human disease prevention and health promotion has expanded rapidly. Northwest regional scientists have been key contributors to this international evidence base. Investigations in PNW cities point to the importance of urban forests and metro nature for individual and neighborhood quality of life. Additional work includes collaboration with the Pacific SW region using combined urban forest and California state health survey data sets, and national level economic valuations of nature-based health benefit across the human life cycle.



credit: Weston Brinkley

LOOKING FORWARD: ENVIRONMENTAL AND SOCIAL JUSTICE

Ongoing studies are being designed to address environmental justice and social equity. Work with King County on public health impacts of urban natural resources is also continuing. Additionally, the health impact assessment effort along the Green-Duwamish is a central guide for GCRA research in the watershed. Veterans, at risk for various emotional stresses and disorders, are another focus. Both nature-based activity (such as stewardship) and passive encounters (such as nature views from one's home) can provide benefit. These studies will explore how people who are working in a range of urban forestry and other jobs, or even just interacting with nature on an everyday basis, can benefit in mind and body.

PUBLICATIONS AND PRESENTATIONS

These lists present the breadth of academic and professional products generated by the Green Cities Research Alliance scientists, technicians, and partners.

Publications: Peer-Reviewed

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Wolf, K.L. 2012. Economics of city trees. *Sitelines: Landscape Architecture in British Columbia*, 14-17.

Romolini, M.; Brinkley, W.; and Wolf, K.L. 2012. What is urban environmental stewardship? Constructing a practitioner-derived framework. R. Note PNW-RN-566. Portland, OR: U.S. Dept. of Agriculture, Forest Service, Pacific Northwest Research Station. 41 p.

White, Rachel E.; Donovan, G.H.; Prestemon, J.P. 2011. Trees thwart shady behavior. *Nursery Management and Production*. Feb: 30-33.

Wolf, K.L. 2011. Green cities for good health: a tool for urban forestry advocacy. *City Trees: Journal of the Society of Municipal Arborists* 7, 2: 8-15.

Moskal L.M., and D. Styers. 2011. Geospatial canopy cover assessment workshop workbook.

Ciecko, L. 2010. Forest Ecosystem Values: Residential private property outreach report.

Wolf, K.L. 2010. City trees, nature and physical activity. *Facility Management Journal* 20, 1, 50-54.

Wolf, K.L. 2009. Trees mean business: city trees and the retail streetscape. *Main Street News* 263, 1-9.

Wolf, K.L. 2009. More in store: research on city trees and retail. *Arborist News* 18, 2, 22-27.

Selected Presentations: Scientific and Academic

Wolf, K. L. 2014. Metro nature design for public Hhealth - Urban ecosystem services. ACES 2014. Washington DC.

Blahna, D. J. , K. L. Wolf, W. Brinkley, and T. Stanton. 2014. Organizing for urban ecosystem services research: Green Cities Research Alliance as an example of a Collective Impact Initiative. ACES 2014. Washington DC.

Wolf, K.L. 2014. Trees for better human habitat: The evidence of health benefits. *Arboricultural Association Conference*. University of London, Royal Holloway. London, UK.

Wolf, K. L. 2014. Civics and urban forestry? review of social-ecological systems research. Hanover Forest Science Seminar, Michigan State University, East Lansing MI.

Hurley, P., M. Emery, R. McLain, and M. Poe. 2013 Gatherable landscapes? Developing a methodological framework for assessing non-timber forest product usage in cities. *Association of American Geographers*, Los Angeles CA.

Brinkley, W. and L. Ciecko. August 2012. A science program for urban natural resource planning and management. *International Society of Arboriculture Conference*, Portland OR.

Wolf, K.L. 2012. The nature and health connection: Social capital and urban greening ecosystems. *International Society of Arboriculture Conference*, Portland OR.

- Brinkley W., K.L. Wolf, S. Schell. 2012. Exploring stewards experiences: Volunteerism in the Puget Sound region as social and ecological solution. Association of American Geographers Annual Conference, New York NY.
- Poe, M., J. LeCompte-Mastenbrook. R. McLain, and P. Hurley. 2012. Urban foraging and ecologies of belonging. Association of American Geographers Annual Conference, New York NY.
- Ciecko, L., and K. Tenneson. 2012. Characterizing and valuing urban forests: Three i-Tree eco project examples. 2012 Society of American Foresters National Convention, Spokane WA.
- Kimmett, D. 2012. Forest assessment of King County's park lands. 2012 Society of American Foresters National Convention, Spokane WA.
- Bazinet, O., M. Romolini and D. Blahna. 2012. Mapping stewardship organizations and projects in the Seattle metropolitan region. 2012 Society of American Foresters National Convention, Spokane WA.
- Sheppard, J., C. Ryan and D. Blahna. 2012. An analytical framework for biophysical impacts of citizen environmental stewardship. 2012 Society of American Foresters National Convention, Spokane WA.
- Brinkley, W. and D. Blahna. 2012. Green Cities Research Alliance: A review and reflection. 2012 Society of American Foresters National Convention, Spokane WA.
- Daniels, J., A. Robbins, W. Brinkley, K.L. Wolf and J. Chase. 2012. Valuing environmental stewardship: A cost approach in King County, Washington. 2012 Society of American Foresters National Convention, Spokane WA.
- Wolf, K.L. 2012 Puget Sound Science Update: Chapter 2B Review. Meeting of the Puget Sound Science Panel. Western Washington University, Bellingham WA.
- Daniels, J., A. Robbins, W. Brinkley, K.L. Wolf and J. Chase. 2012. Estimating the economic value of environmental stewardship volunteer events. Ecological Society of America 97th Annual Meeting, Portland OR.
- Wolf, K.L. 2012. Investing in trees is an investment in your community. Women's Arboriculture Conference 2012, Parksville BC.
- Wolf, K.L. 2012. Creating better human habitat: The evidence says it all. Women's Arboriculture Conference 2012, Parksville BC.
- Wolf, K.L. 2012. Social benefits of nature experience: Urban greening for community sustainability and resilience. Smart Growth National Conference, San Diego CA.
- Wolf, K.L., W. Brinkley, and D. Blahna. 2011. Civic environmental stewardship and urban forestry. Society of American Foresters 91st National Convention, Honolulu HI.
- Brinkley, W. 2011. Increasing ecosystem knowledge and application through collaborative research: Green Cities Research Alliance. 2011 Salish Sea Ecosystem Conference, Vancouver BC.
- Ciecko, L. 2011. Urban forest ecosystem services: Existing tools, model limitations, and policy applications. Salish Sea Ecosystem Conference, Vancouver BC.
- Wolf, K.L. 2011. Urban greening: Community design for gealth. National Healthy Homes Conference: Leading the Nation to Healthy Homes, Families, and Communities, Denver CO.
- Brinkley, W. 2011. Understanding and optimizing volunteer environmental stewardship motivations, operations, and capacity in Seattle. Association of American Geographers Annual Meeting, Seattle WA.
- Moskal, L.M. 2011. Hyper-resolution in remote sensing: What's all the hype about? Association of American Geographers Annual Meeting, Seattle WA.
- Styers, D., L.M. Moskal, et al. 2011. Monitoring urban forest canopies using object-based image analysis and public domain remotely sensed data. Association of American Geographers Annual Meeting, Seattle WA.
- Styers, D.M., and M.D. Dunbar. 2011. Urban forestry, ecology, & natural resources, Panel Session. Association of American Geographers Annual Meeting, Seattle WA.
- Kazakova, A., L.M. Moskal, and S. Styers. 2011. hyperspectral remote sensing of urban tree species. Association of American Geographers Annual Meeting, Seattle WA.
- Wolf, K.L. 2011. The landscape performance series: A satatabase of resources to make the case. Washington Chapter of the American Society of Landscape Architects 2011, Our Challenge -Shaping the Future of the Built Environment, Seattle WA.
- Romolini, M., K.L. Wolf, and D. Blahna. 2011. From sanitary to sustainable: An emerging role and reevaluation of environmental governance and polycentric networks in cities. Resilience 2011, Phoenix AZ.
- Poe, M.R., R. McLain, S. Charnley, P. Hurley, M. Emery, L. Urgenson, and J. LeCompte-Mastenbrook. 2011. Seattle urban foraging: A deeply interactive nature practice. Society for Applied Anthropology Annual Meeting, Seattle WA.
- LeCompte, J., M. Poe, L. Urgenson, and R. McLain. 2011. Urban foraging and gleanng as a place-making practice amongst newly arrived seattleites. Society for Applied Anthropology Annual Meeting, Seattle WA.
- Urgenson, L., M. Poe, R. McLain, and J. LeCompte-Mastenbrook. 2011. Urban foragers' perceptions and use of 'invasive alien plants' in Seattle greenspaces. Society for Applied Anthropology Annual Meeting, Seattle WA.

Wolf, K.L. 2011. Ecosystem services in the city: Urban greening and public health - 40 year research review. Meeting of the National Urban and Community Forestry Advisory Council, Washington DC.

Selected Presentations: Professional and Management

Wolf, K. L. 2014. Green Cities for health and delight. Trees Forever Symposium :: Placemaking - love where you live. Cedar Rapids IA.

Wolf, K. L. 2014. Metro nature & health: review of research & evidence. LandArch 341, College of the Environment, University of Washington, Seattle WA.

Wolf, K. L. 2014. To your good health!: Exploring the links between urban forestry, remote sensing, and economics. Partners in Community Forestry National Conference. Charlotte NC.

Wolf, K. L. 2014. The benefits of nature - What's the value? Oklahoma Urban & Community Forestry Council Annual Conference - Community Forestry, Human Health & Partnerships for Success. Tulsa OK.

Wolf, K. L. 2014. Cultural and social ecosystem services of urban trees and forests, in session on Urban Forest Diversity and Ecosystem Services. IUFRO 2014 World Congress. Salt Lake City UT.

Wolf, K. L. 2014. Plenary session - Designing the city as a habitat. To your good health: Exploring metro nature, remote sensing, and economics. Canadian Urban Forest Conference. Victoria BC.

Wolf, K. L. 2014. Seminar: Trees for better human habitat - the evidence of health benefits. Barcham Trees. Ely, England.

Wolf, K. L. 2014. The economic value of human health benefits from green infrastructure: A life course approach. Grey To Green: A Green Roofs for Healthy Cities Conference. Toronto ON.

Wolf, K. L. 2014. Civic environmental stewardship: Studies in Seattle, USA. Graduate seminar at ALPHA. Awaji Island, Japan.

Wolf, K. L. 2014. The sanitary to sustainable to sacred city: Urban nature experience and engagement. Living in the Megacity: The Emergence of Sustainable Urban Environments. Hosted by the Research Institute on Humanity and Nature. Kyoto, Japan.

Wolf, K. L. 2014. Metro nature services: City trees, urban greening & health. Trees, People and the Built Environment II: Urban Trees Research Conference, University of Birmingham. Birmingham, UK.

Wolf, K. L. 2014. Bridging science and the sacred: How can we connect evidence and emotion. Women's Arboriculture Conference. B.C. Canada.

Wolf, K. L. 2014. Ecosystem services in the city? The case for expanded definitions and values. University of Washington, School of Environmental and Forest Sciences, SEFS Winter Seminars. Seattle WA.

Wolf, K. L. 2014. Dimensions of urban forestry in smart growth: Linkages to health and wellness. Annual New Partners for Smart Growth Conference. Denver CO.

Wolf, K. L. 2014. Linking people to the landscape: urban greening for human health and well being. High Desert Green Industry Conference. Redmond OR.

Wolf, K. L. 2014. Urban greening & livable communities: aka ergonomics of the city. Think Trees New Mexico. Albuquerque, NM.

Wolf, K. L. 2014. Human health and well-being co-benefits: Creating multi-tasking green infrastructure landscapes. Green Infrastructure and Water Management in Growing Metropolitan Areas, University of South Florida. Tampa FL.

Ciecko, L. 2013. Valuing ecosystem services. Puget Sound Urban Forest Symposium, Seattle WA.

Wolf, K. L. 2013. The (smart) benefits of community greening & urban Forestry. Louisiana Smart Growth Summit. Baton Rouge LA.

Wolf, K. L. 2013. Collaborative urban forest management: Rounding up more than the usual suspects. Portland State University Forest Ecology and Management Seminar Series, Portland OR.

Brinkley, W. 2013. Stewardship volunteer motivations in the Puget Sound region. EarthCorps, Corps Training. Seattle WA.

Wolf, K. L. 2013. Urban ecosystem services & SITES: Plants, nature & sustainability. Washington Native Plant Society: Central Puget Sound Chapter Meeting, Seattle WA.

Wolf, K. L. 2013. Be green, be well! Surprising evidence about health and the natural environment. Park Pride 12th Annual Parks & Greenspace Conference, Atlanta GA.

Poe, M. and R. McLain. 2013. Urban foraging and food security research report to the Puget Sound Regional Food Policy Council, Seattle WA.

Wolf, K. L. 2013. Research on trees, nature & public benefits: Be Green, be well! The 2013 North Coast Urban Forestry Conference, Mentor OH.

Ciecko, L. 2013. Characterizing and valuing urban forests. Bartlett Tree Experts Annual Client Seminar, Seattle WA.

Wolf, K. L. 2013. From risk to reward: How Nature supports human well-being. GreenPrint Summit, Sacramento CA.

- Ciecko, L. 2013. Characterizing and valuing urban forests: How to use research to support tree ambassador efforts. Seattle Dept. of Transportation and Seattle Public Utilities, Seattle WA.
- Wolf, K.L. 2012. Urban ecosystems and public health: Metro nature as provider of cultural services. ACES and Ecosystem Markets, Ft. Lauderdale FL.
- Ciecko, L. 2012. Characterizing and valuing urban forests. ESRM 480 Class Lecture, University of Washington, Center for Urban Horticulture, Seattle WA.
- Wolf, K.L. 2012. Landscape benefits: Balancing risk and livable spaces. Green Gardening Program, Honing the Sustainable Edge: Integrating Design, Installation, and Maintenance South Seattle Community College, Seattle WA.
- Wolf, K.L. 2012. Urban ecosystems & human health: Expanding considerations of cultural services. EcoSummit, Columbus OH.
- Wolf, K.L. 2012. Human response to nature: Human dimensions & evaluation for sustainability in prisons programs. Sustainability in Prisons Network Conference, Evergreen State College, Olympia WA.
- Brinkley W., K.L. Wolf. 2012. Volunteer experiences in King County forested parks, 2011. King County Department of Natural resources and Parks, Capital Planning and Land Management Team, Seattle WA.
- Wolf, K.L. 2012. Money doesn't grow on trees, but... The retail benefit of trees. Trees as a Legacy in Design and Development Symposium, Chicago Botanical Gardens, Chicago IL.
- Brinkley, W. 2012. Green Cities Research Alliance: sustainable cities through science, policy, and action. Puget Sound Urban Forest Symposium, Seattle WA.
- Wolf, K.L. 2012. Be green - be well: Research on trees, nature, and public benefits. Sixth Annual South Florida Tree Summit, Florida International University, Miami FL.
- Wolf, K.L. 2012. Urban greening and the livable community: What does the research tell us? Peak to Prairie Landscape Symposium, University of Colorado, Colorado Springs CO.
- Wolf, K.L. 2012. Suitability solutions: Urban greening for human well-being benefits. 17th Water Conservation and Xeriscape Conference, Albuquerque NM.
- Wolf, K.L. 2012. Is tree management worth the trouble? Justifying project budgets. Forest Resource Institute, Myrtle Beach SC.
- Wolf, K.L. 2011. Economic and social values of the urban forest: What is the research? Texas Emerging Communities: Lower Rio Grande Valley Regional Workshop, McAllen TX.
- Wolf, K.L. 2011. Supporting partnerships for green cities & good health. Partners in Community Forestry National Conference, Orlando FL.
- Ciecko, L. 2011. Seattle i-Tree in three acts: Hydrology, outreach, and canopy. Partners in Community Forestry Conference, Orlando FL.
- Brinkley, W. 2011. Understanding and optimizing volunteer environmental stewardship motivations, operations, and capacity in Seattle, Autumn 2010. Seattle Department of Parks and Recreation, Seattle WA.
- Ciecko, L. 2011. Forest ecosystem values project. City of Seattle Urban Forest Commission, Seattle WA.
- Brinkley, W. 2011. Understanding volunteer environmental stewardship: Motivations of Seattle volunteers. Forterra Board of Directors, Seattle WA.
- Wolf, K.L. 2011. Urban greening: Community design for health. National Healthy Homes Conference: Leading the Nation to Healthy Homes, Families, and Communities, Denver CO.
- Moskal, L.M., and D. Styers. 2011. Monitoring Seattle, Olympia and Tacoma forest canopies using object-based image analysis and public domain remotely sensed data. Annual Washington URISA Conference, Lynnwood WA.
- Wolf, K.L. 2011. Urban ecosystem services and their value. The Science, Services and Performance of Sustainable Sites Workshop. University of Washington Botanical Gardens, Seattle WA.
- Wolf, K.L. 2011. The social and economic values of trees in urban neighborhoods. Friends of the Jefferson the Beautiful Tree School, New Orleans LA.
- Romolini, M., K. Wolf, and D. Blahna. 2011. From sanitary to sustainable: An emerging role and reevaluation of environmental governance and polycentric networks in cities. Resilience 2011, Phoenix AZ.
- Poe, M.R., R. McLain, S. Charnley, P. Hurley, M. Emery, L. Urgenson, and J. LeCompte-Mastenbrook. 2011. Seattle urban foraging: A deeply interactive nature practice. Society for Applied Anthropology Annual Meeting, Seattle WA.
- Brinkley, W., and K.L. Wolf. 2011. Understanding volunteer stewardship experiences in Seattle. REI Puget Sound Stewardship Conference, Seattle WA.
- Moskal, L.M., and D. Styers. 2011. Mapping impervious surfaces and canopy cover in Seattle, Olympia & Tacoma using object-based image analysis (OBIA) & public domain remotely sensed data. 2011 UW Water Symposium, Seattle WA.
- Wolf, K.L. 2011. Ecosystem services & urban green infrastructure: Urban greening & public health. National Green Infrastructure Conference 2011, National Conservation Training Center WV.

