Final Report
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Project Name: **GREEN CITIES FOR GOOD HEALTH**
Sharing the Science about Human Health & Well-being

Issued to: University of Washington

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Abstract (as defined by Cooperative Agreement):

Scientific studies across the past 40 years demonstrate the array of benefits provided by urban forests and urban greening, generally described as environmental, economic and social benefits. Human health and well-being (HHWB) is used here to describe social benefits, or the profound human need for nature in the everyday urban settings where people live, work, play, and learn. This project was an extension of a comprehensive review of social science publications that was developed with prior funding – *Green Cities: Good Health* (GCGH). The research content was used to prepare multiple outreach materials, making the science accessible to practitioners throughout the U.S. We have shared the evidence and knowledge with accessible hard copy and digital media. The GCGH summaries were initially prepared from science articles, across all categories of HHWB benefits. In this project outreach fact sheets were derived from the summaries, written to provide practical tools for professionals, NGOs, and concerned citizens. Additional knowledge sharing products included Powerpoint presentations and digital products, including presentation of this information at national and regional conferences. Overall, the products portfolio was intended to: 1) capture and communicate the full range of knowledge about HHWB benefits provided by urban nature, 2) and provide accessible outreach and teaching tools for use throughout the U.S.

1. Project purpose and public benefit:
In recent decades a remarkable collection of scientific studies has provided evidence of the broad array of benefits provided by urban forests. The benefits can be generally described as being environmental, economic and social. This framework of benefits aligns closely with definitions of urban sustainability.

This project focused on one dimension of the benefits evidence – the social. Yet, the term "social" doesn't capture the fundamental and profoundly important array of ecosystem services that we now know are associated with the human experience of nature in cities. "Human health and well-being" (HHWB) will be used in this project to describe how important and essential it is that people have nearby nature in the everyday settings where they live, work, play, and learn.

At this time the environmental benefits and services of urban forests and nature are better understood, or are at least better communicated. Services such as energy savings, improved water and air quality, and mitigation of urban heat islands have been quantified and are now integrated into analysis models (such as i-Tree tools) that summarize benefit levels across a specified city area, and provide estimates of economic value.

HHWB benefits are not now well represented in such benefits models, for the most part being swept into the general label of aesthetics. This project was part of a program to compile a comprehensive, quantitative understanding of human response to urban trees and nature. A multi-stage effort should include 1) Research Assessment and Summary, 2) Geospatial Modeling, and 3) Economic Valuation.

This project will continue the Research Assessment and Summary. Two other completed projects generated the basis of this project. Those activities included: (1) assembling a literature database on urban greening and HHWB of > 2,100 peer-reviewed scientific publications, (2) sorting the documents into a framework of key themes, (3) writing summary essays about the themes, and (4) creating a web-based platform for sharing the summaries: http://www.greenhealth.washington.edu

Ultimately the entire compendium of literature (and the products generated by this project) is a compelling presentation, providing a meaningful justification for why society should invest in urban forestry and green infrastructure. It is a foundation source and public portal that provides substantial findings and understandings. It provides the first ever overview of research on urban nature and human well-being research, work that began in the 1970s.

2. Project objectives:
For this project the University of Washington will partner with the USDA Forest Service on these activities and tasks.

a. The HHWB literature review summaries are being supported in part by another Cooperative Agreement. All summaries will be completed.
b. The multi-page summaries will be reduced to one-page datasheets. All datasheets will be developed and completed.
c. A summary brochure, featuring the entire portfolio of fact sheets, will be developed and completed.
d. Powerpoint presentations and downloadable archived webinars of the HHWB content will be developed and completed.
e. All project outreach travel will be completed by December 2012.
f. Final delivery of all products and deliverables - including professional publications and digital materials via the project web site - will be completed by December 31, 2012.

3. Objectives met successfully to date:
When starting this project our team realized that we needed to review and revise some of the summaries from prior projects. This effort was needed to double check publication citations and better represent study findings.

Schematic designs were developed for the graphic format(s) for the outreach products. The final graphic design for all products has been completed.

Content has been drafted for 100% of the fact sheets and 100% of the Powerpoint presentations.

Five summaries data sheets have been completed. Five Powerpoint presentations have been completed.

Objective 2.d. includes webinar presentation(s). We have determined that webinars are not the best format to distribute the project information. Being more consistent with the other products, we have completed two short videos, downloadable from YouTube, that provide an overview of the benefits summaries:

        Green Cities :: Good Health (3:04 minutes): www.youtube.com/watch?v=te5kIHiZuE0
        Urban Forest Health Benefits (2:21 minutes): www.youtube.com/watch?v=zTwbEogu2b4

No-cost project outreach travel has occurred, due to invitations by non-USFS sponsors. A list of presentations is in Appendix B.

4. Objectives not yet met:
The summary brochure has not been completed.

Additional .html web coding was needed to make all products available on the Green Cities: Good Health web site. This effort displaced development of the summary brochure.

5. How will the results be disseminated to the public?
By design the project is dedicated to public communications and outreach, including all the products listed in the objectives.

The primary platform for results dissemination is a web site. The web site was designed and implemented by the project PI, the University of Washington Creative Communications office, and the environmental communications faculty of Islandwood.

The Green Cities: Good Health web site link is: www.greenhealth.washington.edu

6. Has the project met the projected timeline of accomplishments? Is the project on schedule? Is the project ahead of schedule? Is the project behind schedule? If a no-cost time extension has been requested for this project, why is (was) it needed?

No extension was requested.

7. Additional items of importance:

It is important to note that while the project is based in the Pacific NW, the outcomes have national (and international) significance, as the HHWB literature sources are being assembled across scientific sources, geography, and time. All of the outreach products listed as objectives in item 2. were designed and produced to serve national audiences.

The Green Cities: Good Health research database has become a unique and valuable resource. Appendix A describes additional efforts that would leverage the social science resource that we've created.

The Pacific Northwest Research Station will provide support for the completion of the web pages representing the research summaries and outreach products (datasheets and Powerpoints).

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FS Acceptance and Approval:		
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APPENDIX A: New Projects to Leverage the *Green Cities: Good Health* Science Resource

www.greenhealth.washington.edu

1. **Journal Article.** Prepare a peer-reviewed journal article that conveys the full extent and significance of the science article database. This could be submitted to Arboriculture and Urban Forestry.

2. **Searchable Database.** Create a web page that provides tools to search the article database and generate article lists based on keywords, author, title content, journal name, etc. This would enable users to search and locate publications based on their specific interests or specific benefits. The article database is now stored in tabular format, but the web site does not have a search function.

3. **Upgrade Web Interface.** The current web page appearance and user interface was created several years ago. Our focus to date has been to write and upload text and content. Now that we have a complete collection of science summaries and outreach tools, we could upgrade the graphic quality of the web-based presentation and expand the site's features.

4. **Update Article Database and Summaries**. The pace of publication for research about urban forestry and urban greening and the associated social and community benefits has accelerated dramatically in recent years. In order to keep the web site content up to date with the latest (and best) research the article database should be updated, and summaries revised to present the newer content.

5. **Use Project to Evaluate Technology Transfer Practices.** The GCGH product(s) could be used to test the results and efficacy of a multiphase approach to tech transfer. First we would install analytics code in the site to understand baseline visitation and usage. Then we could devise and implement a series of outreach efforts (e.g. newsletter release, webinar, conference presentations) and measure the resulting web site traffic. While not truly an experiment this process would provide general data on the relationship between outreach actions and audience response.

APPENDIX B: Outreach Products and Presentations

all are downloadable at www.naturewithin.info/new.html

Publications about the project:

Wolf, K.L. 2012. The Changing Importance of Ecosystem Services across the Landscape Gradient (pp. 127-146). In: Laband, D.N., B.G. Lockaby, and W. Zipperer (eds.) Urban–Rural Interfaces: Linking People and Nature. Madison, WI: American Society of Agronomy/Soil Science Society of America/Crop Science Society of America.

Wolf, K.L. 2012. The Nature and Health Connection: Social Capital and Urban Greening Ecosystems. Proceedings of the 2012 International Society of Arboriculture Conference. Champaign-Urbana, International Society of Arboriculture.

Wolf, K. L. 2012. Open Space and Parks. In: Carswell, A.T. (ed.) *The Encyclopedia of Housing, Second Edition.* Sage Publications, 920 pp*.*

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.

Outreach Presentations at conferences, meetings, workshops, etc.:

12-11-12. Urban Ecosystems and Public Health: Metro Nature as Provider of Cultural Services. ACES and Ecosystem Markets 2012 (Ft. Lauderdale FL).

10-27-12. Urban Ecosystem Services: Public Health and Cultural Services. Society of American Foresters 2012 National Convention (Spokane WA).

10-16-12. Landscape Benefits: Balancing Risk and Livable Spaces. Green Gardening Program :: Honing the Sustainable Edge: Integrating Design, Installation, and Maintenance (South Seattle Community College).

10-6-12. Urban Ecosystems & Human Health: Expanding Considerations of Cultural Services. EcoSummit (Columbus OH).

9-13-12. Human Response to Nature: human dimensions & evaluation for Sustainability in Prisons programs. Sustainability in Prisons Network Conference (Evergreen State College-Olympia WA).

8-13-12. The Nature and Health Connection: Social Capital and Urban Greening Ecosystems. International Society of Arboriculture 88th Annual Conference (Portland OR).

6-28-12. Money Doesn't Grow on Trees, But . . . the retail benefit of trees. Trees as a Legacy in Design & Development Symposium (Chicago Botanic Gardens).

5-10-12. Be Green-Be Well: Research on Trees, Nature, and Public Benefits. Sixth Annual South Florida Tree Summit (Florida International University, Miami).

4-27-12. Green Urban Communities: Commitment :: Human Habitat :: Climate. Biophilia Revisited Graduate Seminar, Department of Plant and Soil Sciences, University of Delaware (Newark, DE).

3-30-12. Urban Greening and the Livable Community: What Does the Research Tell Us? Peak to Prairie Landscape Symposium (University of Colorado, Colorado Springs).

3-22-12. Creating Better Human Habitat: The Evidence Says It All. Women's Arboricultural Conference 2012 (Parksville, British Columbia, Canada).

2-23-12. Sustainability Solutions: Urban Greening for Human Well-Being Benefits. 17th Water Conservation and Xeriscape Conference (Albuquerque NM).

2-20-12. Is Tree Management Worth the Trouble? Justifying Project Budgets. Forest Resource Institute (Myrtle Beach SC).

2-8-12. Creating Healthy Places to Live – Parts 1 & 2. Mississippi Urban Forest Council Annual Conference (Jackson MS).

2-4-12. Social Benefits of Nature Experience: Urban Greening for Community Sustainability and Resilience. Smart Growth National Conference (San Diego CA).

11-17-11. Economic and Social Values of the Urban Forest: What is the Research? Texas Emerging Communities: Lower Rio Grande Valley Regional Workshop (McAllen TX).

11-16-11. Supporting Partnerships for Green Cities & Good Health. Partners in Community Forestry National Conference (Orlando FL).

11-5-11.Urban Ecosystem Services: Urban Greening & Public Health. Society of American Foresters 91st National Convention (Honolulu HI).

9-17-11. Green Cities, Good Health Workshop. California Urban & Community Forests Conference (Palo Alto, CA).

5-18-11. Urban Ecosystem Services & Their Value. The Science, Services and Performance of Sustainable Sites Workshop; University of Washington Botanic Gardens (Seattle WA).

5-18-11.Urban Ecosystem Services & Their Value. The Science, Services and Performance of Sustainable Sites Workshop; University of Washington Botanic Gardens (Seattle WA).

4-13-11. The Social and Economic Values of Trees in Urban Neighborhoods. Friends of Jefferson the Beautiful Tree School (New Orleans LA).

4-1-11. The Landscape Performance Series: A Database of Resources to Make the Case. Washington Chapter of the American Society of Landscape Architects; WASLA 2011; Our Challenge - Shaping the Future of the Built Environment (Seattle WA).

2-22-11. Ecosystem Services & Urban Green Infrastructure: Urban Greening & Public Health. National Green Infrastructure Conference 2011 (National Conservation Training Center, WV).

12-7-10. Ecosystem Services in the City: Urban Greening and Public Health. ACES: A Community on Ecosystem Services (Phoenix AZ).

11-1-10. Green Cities & Good Health: What do we know? Savannah Tree Foundation (Savannah GA).

10-28-10. Green Cities and Good Health: What Do We Know? Trees SC: Connecting People and Trees (Charleston SC).

10-20-10. Geospatial Linkages of Green Infrastructure and Positive Public Health. 2010 ESRI Health GIS Conference (Denver CO).

9-22-10. Workshop 1: Trees for Better Communities-Economics and Livability. Trees Mean Business: 31st Texas Tree Conference (College Station TX).

9-23-10. Keynote: Trees and Community Economics - A Social Perspective. Trees Mean Business: 31st Texas Tree Conference (College Station TX).

8-5-10. Opening up the Treasure Chest: An Overview of Research on Human Health and Well   Being. Social Landscaping: Creating and Marketing Healthy and Livable Communities. California Releaf Network Retreat (Sacramento CA).

7-22-10. How Trees Grow Communities. The Social Tree: New York State Urban & Community Forestry Council Conference (Rochester NY).

6-4-10. Urban Forest Ecosystem Services: Seattle as a Case Study. Cambodia/Laos Delegation, Ecosystem Services Study Tour (USDA Forest Service; Seattle, WA).

4-13-10. Considering a Comprehensive Ecosystem Services Framework Across the Wildland to Urban Interface. Emerging Issues Along Urban/Rural Interfaces 3: Linking Science & Society (Atlanta, GA).

3-5-10. Human Health & Well-Being: Evidence for an Expanded Framework of Ecosystem Services in Cities. Million Trees NYC, Green Infrastructure, and Urban Ecology: A Research Symposium (New York, NY).

3-2-10. Trees for Livable Cities: Science for Urban & Community Forestry. Sustainable Urban Forests Coalition, Congressional Briefing (Washington DC).

2-16-10. Ecology in the City: Nearby Nature and the Restoration of Self and Society. Society for Ecological Restoration Northwest: 2010 Joint Regional Conference | SERNW & TWS-WA (Tulalip WA).

2-5-10. Integrating Green Infrastructure into the City: From Planning to Best Practices. 9th Annual New Partners for Smart Growth: Building Safe, Healthy and Livable Communities (Seattle WA).

1-20-10. City Trees & Health: The Nature of Physical Activity. Counting on Quality of Place, a program of the Center for Houston's Future (Houston, TX).

12-16-09. The Value of Trees to Spokane. City of Spokane Urban Forest Seminar (Spokane WA.

11-13-09. Multiple Values of the Urban Forest. Community Forests Grow Community Benefits: North Virginia Urban Forestry Roundtable (Algonkian Regional Park VA).

11-9-09. The Science of Trees and Human Health & Well-Being: Packaging Research for the Urban Forestry Community. Partners in Community Forestry National Conference (Portland OR).