

FY16 Application for Nursery Research Funding
Washington State Department of Agriculture - Nursery License Surcharge
(Please use one application packet, including the Progress Report page for each proposal.
You must use our form - failure to do so may result in not funding your project.)

Project Title: Rain gardens: What can be learned from the experiences of practicing landscape professionals regarding costs, benefits, concerns, and climate change impacts?

Project Leader: Virginia I. Lohr and Rita L. Hummel

Institution (if any): Department of Horticulture, Washington State University (Pullman and Puyallup)

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Project Phone Number: Dr. Lohr: (509) 335-3101 Dr. Hummel: (253) 445-4524

Note: Project leader or his/her designee must be available at above project phone number on February 27, 2015 between the hours of 10:00-12:00 and 1:00-3:00.

(Check One) New Project [checked] Continuing

Start Date: July 1, 2015 Completion Date: June 30, 2016

Amount Requested for (FY16) July 1, 2015 to June 30, 2016: \$8,500

If this is a multiple year project, please estimate and list the following information for each future July 1 - June 30 period listed below through project completion:

Table with 6 columns: Fiscal Years (FY), July 1, 2016 to June 30, 2017, July 1, 2017 to June 30, 2018, July 1, 2018 to June 30, 2019, July 1, 2019 to June 30, 2020, July 1, 2020 to June 30, 2021. Row 1: \$ Amount Needed

If you are increasing the above amounts since your last application, please explain why:

*Please list all other sources and amounts of funding for this project for the current year only: (Please notify us by February 15 if other funding has been approved and from where.)

Table with 4 columns: Source, \$ Amount Applied For, Approved, Pending Date of Notification. Row 1: none

Total Amount Needed to Fund Project (include all sources*) \$8,500

If total amount from all sources is not granted, will you be able to complete the project? No

Explain: Completion of this project as described in this proposal requires the amount of funding requested. If less money is granted, we may be able to do a smaller or less thorough version of the project, leaving potentially vital research questions unanswered.

Please indicate which sector(s) of the nursery industry stand to benefit from the results of your research: (Letters of support from the industry are encouraged.)

Landscape management professionals; landscape designers & architects; growers, wholesalers, and retailers.

Submit 16 copies of this proposal to: Tom Wessels, Plant Services Program Manager, P.O. Box 42560, Olympia, WA 98504-2560, twessels@agr.wa.gov, or fax (360) 902-2094. All applications must be postmarked by December 31, 2014.

Please summarize the purpose of this research: (you may attach additional sheets if necessary or submit this summary in your own format)

Recently, rain gardens have been recommended and installed to improve water quality in urban areas. They have been heavily promoted in the Puget Sound area, for example by the *12,000 Rain Gardens in Puget Sound Campaign* by Stewardship Partners and Washington State University (www.12000raingardens.org). Rain gardens are a partial solution to water problems in urban areas. They are effective in managing stormwater run-off and improving water quality. Questions, however, are increasingly being asked about their long-term benefits. This proposed research will collect information from practicing landscapes professionals in western Washington regarding their actual experiences with designing, installing and maintaining rain gardens and how they relate to the costs, benefits, concerns, and climate change impacts of rain gardens.

Green infrastructure, using nature to solve urban environmental problems, is growing in application. Low impact development, a form of green infrastructure, is an emerging concept for treating urban stormwater with a goal of restoring the natural hydrologic function to urban landscapes. One important tool in this integrated approach is bioretention, which utilizes the biological, physical, and chemical properties of plants, soil media, and microorganisms to promote water infiltration and pollutant removal. Rain gardens, a form of bioretention cell, are growing in popularity. They are shallow depressions in the landscape filled with soil media and plants. Plants are a critical component in the proper functioning of rain gardens, as the plants transpire water and increase favorable soil infiltration and microbiological activity.

The importance of rain gardens extend well beyond their capabilities to control stormwater run-off and remove pollutants. They contribute to recharging ground water and improving water quality in creeks, streams, rivers, and bays. They also provide habitat for birds, butterflies, and beneficial insects. Other ecosystem services include increasing biodiversity and mitigating the impacts of climate change. Rain gardens also contribute to human health, providing restorative and beautiful views of nature. Rain gardens can only provide these benefits if they are installed and if they are effective over time.

Some research on rain gardens is beginning to raise questions about the long-term functionality of bioretention cells, claiming that they silt up, especially if not properly maintained, become less effective in collecting and storing rain water, and lose effectiveness in filtering pollutants. Other studies indicate that rain gardens as much as eight years old continue to provide these ecosystem services. Many of the studies on rain gardens, including these reports of losing or maintaining functionality, have been conducted in parts of the US, including MN and NC, where the climate year-round is very different from that in the Pacific Northwest, with our cool, wet winters and very dry summers. Rain garden performance is likely to be quite different in our region. Gathering data regarding the actual experiences with rain gardens of landscape professionals in western Washington is an important first step in understanding how their performance in our area might be better or worse than in other parts of the country and in making recommendations to ensure long-term viability. This information could also be used to develop appropriate case studies in the Pacific Northwest to illustrate critical information about rain gardens in our area.

Methods of research:

This research will be conducted in two phases. Phase 1 will consist of a focus group interview with up to eight landscape professionals to generate qualitative data about their common experiences and perceptions regarding the costs, benefits, concerns, and climate change impact of rain gardens in western Washington. The interview will be taped and transcribed for analysis. Phase 2 will consist of an on-line survey of many professionals in the green industry who design, install, or maintain rain gardens. It will generate both quantitative and qualitative data. Information gathered in the focus group interview will be used to develop survey items used in the on-line survey. Phrasing from the focus groups will be used to develop survey items to ensure that the wording is similar to that used by landscape professionals when referring to issues related to rain gardens. Standard, accepted methods of focus group and survey methodology, such as Dillman (2000), will be followed. The research will be submitted to the Washington State University Human Subjects Institutional Review Board for review before beginning this research.

Funds are requested for wages for transcribing the interview, developing participant contact lists for both phases, creating the survey, contacting and following up with participants, preparing data for analysis, and preparing tables and visuals of the results for dissemination. Travel funds are to travel between Pullman and Puyallup during the focus group interview phase and during data analysis and interpretation. Supplies and services include funds for costs associated with the focus group interviews, software for creating the survey and analyzing the data, and publication costs to disseminate the results to appropriate audiences.

The work combines the survey methodology expertise of Dr. Lohr with the rain garden knowledge of Dr. Hummel. Dr. Lohr has been the principal investigator on numerous surveys (see, for example, Lohr, 2014 or Lohr and others, 2004). Dr. Hummel has been investigating the effects of different landscape palettes in rain gardens since 2010.

The results of this project will ultimately be communicated through articles in scientific and trade publications; presentations at industry seminars and workshops; on-site tours; and web sites. Knowledge gained from this project has the potential to directly benefit those who design, install and maintain rain gardens: landscape installers, landscape maintenance professionals, landscape designers, and landscape architects. Others will benefit indirectly by increasing their understanding of how to promote their effectiveness or through increased installation of rain gardens; these include growers, wholesalers, retailers, homeowners, local governments, consulting engineers, planners, and other allied disciplines. It will allow them to make more practical and effective choices for rain garden design, installation, and maintenance for western Washington.

The results of this project will be invaluable for selecting appropriate case study examples for future analysis. The results can be used for a preliminary review of potential sites to be sure they contain the appropriate elements for the most effective demonstration of the values of rain gardens, whether for focusing on costs, benefits, concerns, or climate change impacts.

**Expenditure Breakdown:
(Please include salaries, supplies, travel, etc.)**

Wages, Salaries and Benefits	\$ 5,500
Supplies and Services	\$ 2,200
<u>Travel</u>	<u>\$ 800</u>
Total	\$ 8,500

Supporting Literature:

- Asleson B.C., R.S. Nestingen, J.S. Gulliver, R.M. Hozalski, J.L. Nieber. 2009. Performance assessment of rain gardens. *J. American Water Resources Association* 45(4):1019-1031.
- Dillman, D.A. 2000. *Mail and internet surveys: The tailored design method*. 2nd ed. John Wiley and Sons, New York, NY. 464 pp.
- Lohr, V.I. 2014. Climate change literacy in post-secondary horticultural education in the United States. *HortTechnology* 24(1):132-137.
- Lohr, V.I., C.H. Pearson-Mims, J. Tarnai and D.A. Dillman. 2004. How urban residents rate and rank the benefits and problems associated with trees in cities. *J. Arboriculture* 30:28-35.
- Merriman, L.S. and Hunt, W.F. III. 2014. Maintenance versus maturation: Constructed storm-water wetland's fifth-year water quality and hydrologic assessment. *J. Environ. Eng.* 2014:140, 11 pgs.
- Paus, K.H., J. Morgan, J.S. Gulliver, T. Leiknes, and R.M. Hozalski. 2014. Assessment of the hydraulic and toxic metal removal capacities of bioretention cells after 2 to 8 years of service. *Water Air Soil Pollut* 225:1803, 12 pgs.

The information requested on this page will have a direct bearing on whether your research request is approved or denied. Letters of support from the industry are also encouraged.

Note: Funding is not available for general overhead cost.