



2013 Annual Green Roof Industry Survey

April 2014



Introduction

Green Roofs for Healthy Cities (GRHC) is a member-based non-profit industry association that is dedicated to the development of the green roof and wall industry throughout North America. Highlights of the **Annual Green Roof Industry Survey** are provided below. This marks the 10th year that Green Roofs for Healthy Cities has conducted this Survey of its members and shared the results with a wide range of stakeholders. The Survey is just one of many programs and activities GRHC delivers in order to advance the industry:

- Administration of the **Green Roof Professional (GRP)** training and accreditation program which is designed to develop, disseminate, and promote best practices in green roof design, installation, and maintenance. Find one of more than 650 accredited GRPs at www.greenroofs.org.
- Providing ongoing professional development through the creation of new leading-edge full and half-day training courses, including the new **Net Zero Water Boot Camp** to be launched in November of 2014. (See Appendix I for a full list of GRHC's professional training courses).
- Organization of a major annual conference – **CitiesAlive** (*Water: The Key to Everything Green*, Nashville , November 12 -15, 2014, www.citiesalive.org) and a regional conference – **Grey to Green** (*Focusing On Health*, Toronto, August 25-26, 2014, www.greytogreenconference.org).
- Publishing the **Living Architecture Monitor® (LAM)**, a quarterly digital and print magazine that covers emerging research, design, manufacturing and policy activity, and reaches more than 12,000 readers per issue. (www.livingarchitecturemonitor.org)
- Publishing the **Journal of Living Architecture (JOLA)**, a quarterly publication of outstanding, peer reviewed scientific research.
- Providing a wide range of membership benefits for companies, non-profit organizations, and individuals, including company promotion, dissemination of leads, and advertising, training and event discounts. www.greenroofs.org/membership
- Advocacy through **Local Market Development Symposia**, which advocate for green roof and wall policies to help develop local markets.
- Recognizing outstanding integrated design and installation with the **Green Roof & Wall Awards of Excellence**, presented annually at **CitiesAlive**

- Developing the **Living Architecture Performance Tool**, a project to quantify performance characteristics of different living architecture technologies for designers, policymakers, and manufacturers.
- Supporting international market development through the **World Green Infrastructure Network**, whose *World Green Infrastructure Congress* will take place in Sydney, Australia October 7 - 10, 2014. (www.worldgreenroof.org)

Annual Survey Methodology

Each year since 2004, GRHC has conducted a voluntary survey of its Corporate Members in order to collect data on the growth and composition of the green roof industry across North America. GRHC's Corporate Members voluntarily and confidentially provide the following information on each of their projects:

- square footage
- location
- whether the building is public or private
- green roof type— intensive, semi-intensive, or extensive.

The data is collected and duplicate entries are removed from the data set by comparing the type, size, and location of each project. The square footage of green roof installations is then aggregated geographically to give the top ten metropolitan regions data.

Annual growth rates are derived by averaging the change in the square footage recorded by a representative sample of 24 Corporate Members from year to year, not square footage totals, which vary depending on the number of submissions each year. The growth rate is multiplied by the previous year's estimate to provide a more accurate overall estimate of the square footage installed. This method provides a more accurate value for the growth rate than square footage totals, which do not capture all of the activity in the market.

This survey data does not capture all market activity because many of GRHC's Corporate Members do not participate. For the 2013 Survey, 27 Corporate Members supplied data. We estimate that the data in this report understates market activity by anywhere from 25 to 50 percent given that not all firms in the industry are members and not all members are able or willing to participate in the survey. However, it does provide important insight into the composition of an industry that continues to grow rapidly, despite the difficult economic times.

The full data set is made available to all of our Corporate Members as a membership benefit, with specific location and project attribution removed.

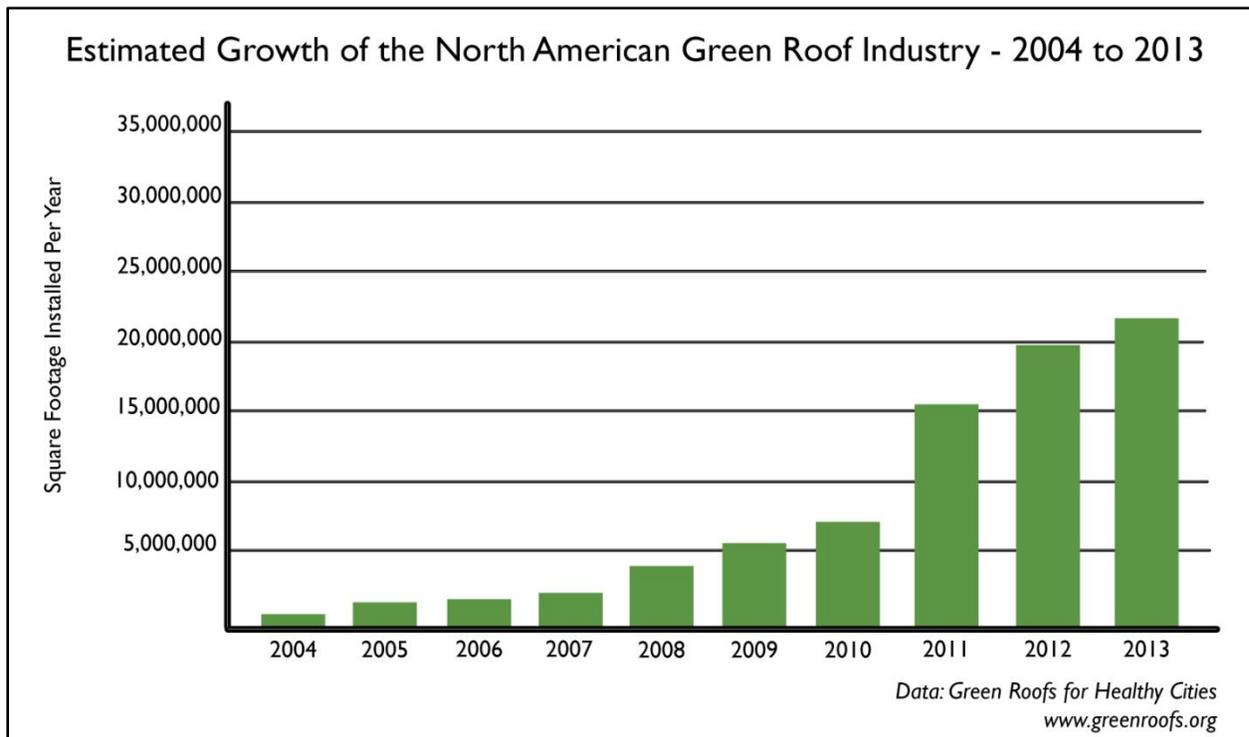
Annual Survey Findings

The North American green roof industry grew by 10% in 2013 over 2012, in keeping with the double-digit growth rates the industry has experienced over the past decade.

In terms of reported totals, members recorded 6,421,538 square feet installed in 2013 (on 950 projects), up from 5,588,098 square feet installed in 2012 (on 982 projects).

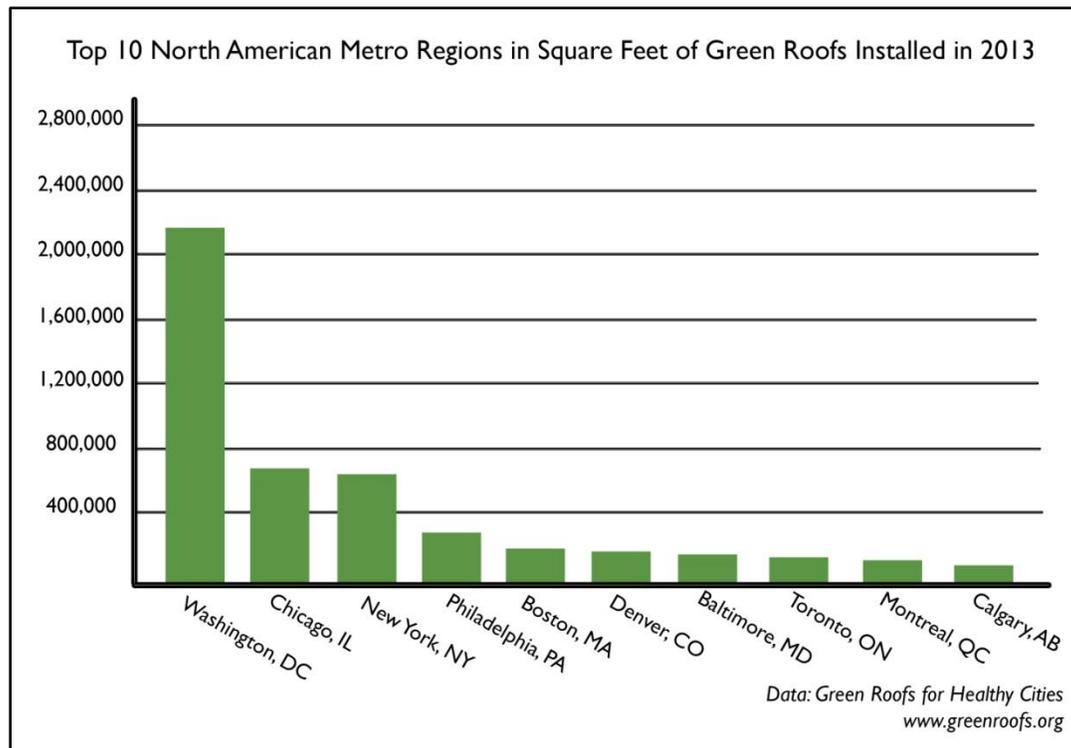
A significant development this year is that more square feet were installed on public projects than private, whereas in previous years this had been more equal. 2,624,539 square feet were installed on public projects as opposed to 1,685,233 on private projects, with the remainder unspecified. However, the number of green roofs reported installed on private projects was far higher, indicating that the average green roof installed on a public project in 2013 was far greater in size than that on a private project.

The total square footage reported below is obtained by multiplying the average member growth rate from a selection of members whose businesses reflect general industry trends by the total square footage estimated for the previous year. This provides a more accurate estimate of the square footage installed than the numbers reported by members in the survey which is always significantly lower for reasons described in the methodology section.



Results by Metropolitan Region

The chart below shows which North American metropolitan regions installed the most square feet of green roofs in 2013. For the third straight year, a green roof boom in Washington, DC has given it the top spot. Rounding out the top five are Chicago, New York City, Philadelphia, and Boston.



Of the top ten metro regions, seven of the main municipalities within have supported green roofs directly through policy, programming, or the installation of government projects. Appendix II shows a large selection of public policy that has been implemented across North America in support of green roofs.

Public policy support helps to reduce the upfront costs of a green roof and monetize their many public benefits such as:

- Aesthetic improvement
- Waste diversion
- Stormwater management
- Moderation of urban heat island effect
- Improved air quality
- New amenity spaces
- Local job creation

The Benefits and Challenges of Green Roofs on Public and Commercial Buildings, a study by Arup for the United States General Services Administration in 2011, found that over the course of 50 years an extensive green roof would generate the equivalent of \$38/sf of public benefit.

The public benefits of green roofs may include:

- Stormwater management – quality and quantity
- Increased biodiversity
- Moderation of the urban heat island effect
- Improvement of air quality
- Improvement of aesthetics in the public realm
- Local and regional job creation
- The addition of new amenity spaces
- Urban food production and enhanced food security.

In addition to policy support, the growth of the green roof industry can also be attributed to some extent to the Green Roof Professional (GRP) accreditation program. There are now more than 650 dedicated GRPs across North America. Through training and a third party-managed accreditation exam, the GRP program:



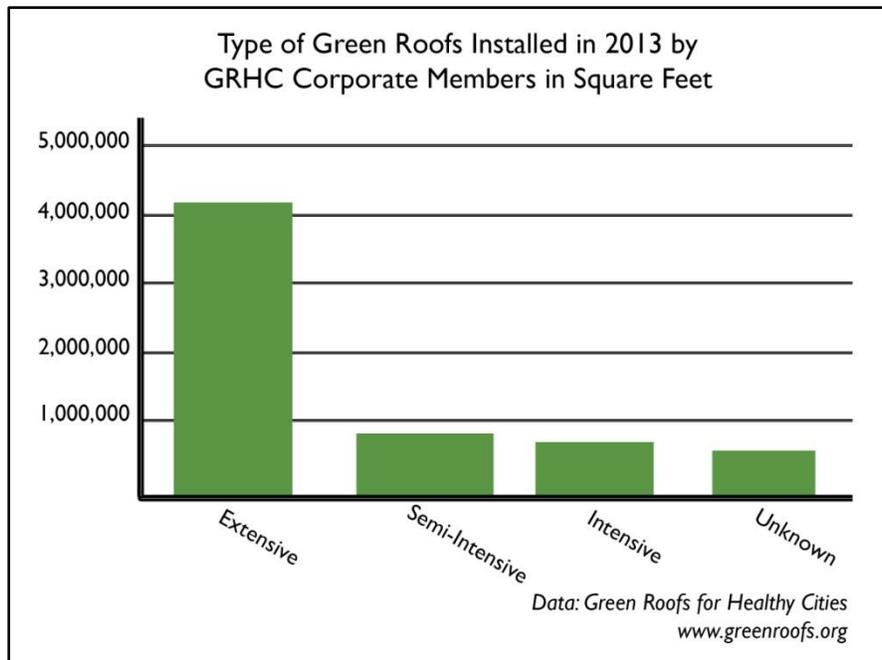
- Enables professionals to differentiate themselves in the marketplace
- Establishes a high-level of professionalism and improved multi-disciplinary collaboration
- Increases customer confidence in green roof technology
- Results in better green roof design and installation practices
- Protects the industry from the inevitable failures that result from inappropriate design, installation, and maintenance practices.

The GRP Online Directory is accessible to the public at www.greenroofs.org.

To view GRHC's Corporate Members,
www.greenroofs.org/membership/corpmemberdirectory

Results by Category of Green Roof

Green roof types fall into three categories: extensive, semi-intensive, and intensive. As in past years, the number of extensive green roofs (six inches of growing medium or less) installed outnumbered the amount of intensive green roofs (over six inches of growing medium) or semi-intensive (areas of both types).



Conclusion

As it has every year since GRHC began conducting the **Annual Green Roof Industry Survey**, the green roof market in North America grew significantly in 2013, despite the ongoing sluggishness of the American and Canadian economies and the tapering off of stimulus funds. Many cities across North America have recognized the public benefits of green roofs and have taken various policy measures to encourage their widespread installation which fuels demand.

However, there is still enormous potential for growth of new green roofs on tens of billions of square feet of roofs across North America. In 2012 GRHC established an industry goal of one billion square feet of green roofs installed in North America by 2022. GRHC encourages municipalities, regions, states, and provinces to adopt policies in support of green roofs and green walls in order to build healthier, more sustainable and resilient communities.

GRHC would also like to thank its many Corporate Members for their ongoing commitment to supplying data for this annual survey and recognize the contribution of the more than 650 GRPs in the marketplace, who contribute to the growth of the industry. The combination of government support, member outreach, and an increasing number of motivated green roof professionals will enable us to reach our target.

Appendix I: GRHC's Professional Training Courses

Full-Day Courses - For Green Roof Professional (GRP) Accreditation

- Green Roof Design & Installation
- Green Roof Waterproofing & Drainage
- Green Roof Plants & Growing Media

Half-Day Courses

- Advanced Green Roof Maintenance
- Ecological Design for Green Roofs
- Green Infrastructure: Policies, Performance, and Projects
- Living Architecture and Sustainable Energy
- Green Walls 101: Systems Overview and Design, 2nd Edition
- Introduction to Rooftop Urban Agriculture
- Integrated Water Management for Buildings & Sites I, II, III, and IV (Net Zero Water Boot Camp will be launched at *CitiesAlive 2014* in Nashville, November 12-15, 2014)

Appendix II: Selected Cities and Their Dedicated Green Roof Policies

- Minneapolis Stormwater Utility Fee Credit – established 2005
- Chicago Green Permit Program – established 2006
- Washington DC Green Roof Rebate Program – established 2007
- Philadelphia Green Roof Tax Credits – established 2007
- Anne Arundel County (MD) Stormwater Management Tax Credit – established 2008
- State of New York Green Building Construction Act – established 2009
- Toronto Green Roof Bylaw and Eco-Roof Incentive Program – established 2009
- Onondaga County (Syracuse, NY) Green Improvement Fund – established 2010
- Milwaukee Metropolitan Sewerage District Regional Green Roof Initiative – established 2010
- Austin (TX) Green Roof Density Bonus – established 2011
- Nashville (TN) Green Roof Rebate – established 2012
- Richmond (VA) Fast-Track Permitting – established 2012
- Atlanta Post-Development Stormwater Management Ordinance – established 2013
- Prince Georges County (MD) Rain Check Rebate Program – established 2013

Appendix III: Green Roofs for Healthy Cities Publications

To purchase these resources go to www.greeninfrastructurestore.com

Advanced Green Roof Maintenance Training Manual (2011). Green Roofs for Healthy Cities. This manual contains indispensable information on green roof care and upkeep.

Award Winning Green Roof Designs (2008). Atglen: Schiffer Books.

This book features over 100 beautiful, informative photos that display the green roofs technology in award-winning designs. The projects are almost exclusively the product of multi-disciplinary, collaborative design processes. Details about the plants used, growing media, drainage and irrigation systems, and waterproofing, along with descriptions of challenges overcome, and innovations developed, are provided.

Ecological Green Roof Design Training Manual (2006). Green Roofs for Healthy Cities.

Ecological Design for Green Roofs is a specialized course that teaches participants how to achieve maximum biodiversity benefits from their projects and design green roofs to support native flora and fauna.

Green Infrastructure: Policies, Performance, and Projects Training Manual. Green Infrastructure Foundation.

This course provides attendees with a review of various vegetative technologies in urban areas (i.e. green walls, green roofs, urban forests, rain gardens), presents the latest research on their many performance benefits, and showcases a variety of leading edge policy and program developments in cities such as Chicago, Seattle, New York and Toronto that support the greening of our cities. Ideal for policy makers and other advocates of urban greenery.



Green Roof Design & Installation Training Manual (2013). Green Roofs for Healthy Cities.

Green Roof Design and Installation is an updated and consolidated version of our Green Roof Design 101: Introductory Course and Green Roof Design and Installation 201 course manuals. It incorporates new research on green roof benefits and the latest technical standards, and presents tools and techniques needed to meet green roof project objectives on schedule, to specification, and within budget.

Green Roof Waterproofing and Drainage 301 (2007). Green Roofs for Healthy Cities.

This course will provide participants with an overview of waterproofing and drainage construction and maintenance for green roof assemblies. It lays out technical vocabulary and materials and presents detailed design solutions and implementation best management practices for waterproofing and drainage in green roofs.

Green Roof Plants and Growing Media 401 (2008). Green Roofs for Healthy Cities.

This course will provide participants with an overview of plants and growing media design considerations and maintenance for green roof assemblies. It establishes design and implementation best management practices for plants and growing media in green roofs.

Green Walls 101: Systems Overview and Design Training Manual (2010). Green Roofs for Healthy Cities. This updated version of our *Green Walls 101: Introduction to Systems and Design* course discusses design and construction best practices for green facades and living walls, as well as the latest research findings on the environmental benefits of these technologies.

Integrated Water Management for Buildings and Sites I, II, III, & IV Training Manuals (2010, 2011, 2012, 2013). Green Roofs for Healthy Cities.

Developed jointly by GRHC and American Society of Irrigation Consultants (ASIC) committee members, these courses provides technical and economic information on the design and performance of a fully integrated site and building water management system based on the “Net Zero Water” concept.

Introduction to Rooftop Urban Agriculture Training Manual (2010). Green Roofs for Healthy Cities.

This course – the first of its kind in North America at the time of its launch in December 2010 – discusses multiple approaches to growing food on rooftops through design and maintenance principles, and case studies drawn from across North America.

Living Architecture and Sustainable Energy (2013). Green Roofs for Healthy Cities. This course discusses innovative approaches for integrating green roofs and walls with other green building services to reduce or eliminate energy inputs from unsustainable sources and enhance economic and health performance. Topics include: intake air cooling, photovoltaics, air freshening, bio-energy production, moderation of heat loss and gain through the building envelope, and more.

Living Architecture Monitor (1999-present). Green Roofs for Healthy Cities.

The *Living Architecture Monitor* is GRHC’s quarterly magazine. It features in-depth interviews with leaders in the green building movement, opinions, research, as well as detailed case studies and new developments in the green roof and wall industry.

The Rise of Living Architecture (2012). Green Roofs for Healthy Cities.

The ROLA (right) is a limited-edition tabletop book that profiles more than 50 of the hundreds of leaders that have created the base and molded the foundation of living architecture.



Acknowledgements

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