



IMPACT AREA:
SUSTAINABILITY

STORM BUSTERS

A **CITIES OF SERVICE** BLUEPRINT

Storm Busters is a high-impact service strategy in which the mayor's office engages volunteers to help mitigate damage from stormwater runoff and improve the health of the city's surrounding waterways by planting trees and rain gardens, cleaning waterways, and restoring river and stream banks.

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STORM BUSTERS

Storm Busters is a high-impact service strategy in which the mayor's office engages volunteers to help mitigate damage from stormwater runoff and improve the health of the city's surrounding waterways by planting trees and rain gardens, cleaning waterways, and restoring river and stream banks.

Stormwater runoff is a major cause of water pollution in our cities. Mayors are recognizing the value of creating and preserving their cities' "green" infrastructure as an effective approach to stormwater management. Green infrastructure takes advantage of the natural processes of soils, plants, and trees in order to slow down, clean, and filter stormwater before it reaches the sewer system, reducing the burden on sewage facilities. In addition to being less costly than replacing existing sewers and building new waste water treatment plants ("grey" infrastructure), green infrastructure brings many other benefits to a city, including decreasing its urban heat island effect, increasing recreational opportunities, and providing jobs in the growing green economy sector.¹

¹ The Value of Green Infrastructure: A Guide to Recognizing Its Economic, Environmental and Social Benefits (Guide) (CNT and American Rivers, 2010)





BACKGROUND

Ideally, when rain falls, the water is absorbed and filtered by a natural collection system of soil, plants, and trees. All too often, however, overdevelopment leaves a city with little green space and too few plants and trees. As a result, rain falls on roofs, streets, and parking lots, and cannot reach or soak into the ground quickly enough. Stormwater then rushes into the sewer system and is rapidly discharged into nearby waterways, often carrying trash, bacteria, heavy metals, and other pollutants along with it and degrading the quality of the receiving waters. Resulting higher water flows lead to erosion and flooding in urban streams, damaging nearby property and the native habitats of many plants and animals.

Mayors are recognizing the value of creating and preserving their cities' "green" infrastructure as an effective approach to stormwater management. While green infrastructure encompasses a wide array of practices and strategies, Storm Busters highlights ways that volunteers can best support this approach: installing rain gardens that collect and absorb runoff from roofs, sidewalks, and streets; planting trees that reduce stormwater by intercepting precipitation on their leaves and branches and absorbing water through their root systems; caring for newly planted trees to insure that they continue to thrive; and cleaning waterways and restoring river and stream banks that are damaged during storms.





REQUIRED ELEMENTS

- 1** **Mayor's office engages appropriate city agency leads, technical experts, and local partners involved in green infrastructure, environmental sustainability, and volunteer management to:**
 - Develop the plan for the Storm Busters initiative;
 - Establish responsibility for volunteer recruitment, training, and management;
 - Guarantee support from city departments; and
 - Engage partners, particularly those with expertise in stormwater management, to help design and gather impact metrics.
- 2** **Mayor's office secures donations and grant funding to implement Storm Busters.**
- 3** **Volunteers assist in planting and caring for trees and rain gardens, cleaning up waterways, and/or restoring river banks.**
- 4** **Mayor's office works with partners to track and report on the impact of the initiative.**

Depending upon the activities chosen, the mayor's office tracks and reports on the following metrics:

- Number of trees planted
- Number of trees adopted and cared for
- Percentage of trees that survive the first year
- Number and square feet/acreage of rain gardens planted
- Amount of rainwater runoff mitigated
- Feet/mileage of waterways assessed and cleaned
- Square footage/total acreage of river banks restored by tree plantings and using other natural materials
- Pounds or volume of debris removed from river area





EXECUTING THE PLAN

DEVELOPING THE INITIATIVE

Conduct an initial planning meeting with all initiative partners. Good partners may include organizations with expertise in urban sustainability, water conservation, and green infrastructure; a regional representative from the Environmental Protection Agency; local environmental groups with experience in volunteer recruitment and management; and local nurseries and urban forestry experts. City agencies such as the water or stormwater department, parks and recreation, the sustainability office (if the city has one), the city's horticulturist/arborist or landscape manager, and the public works department, including the city's waste handlers should also participate in the initial planning. The planning meeting is an opportunity to:

- Introduce partners and clearly define roles and expectations.
- Determine which projects address the city's most urgent needs and have the most potential to make a significant impact.
- Once the project(s) is/are selected, outline the scope of each project, including any work that must be done prior to engaging volunteers.
- Identify volunteer-friendly service opportunities and site locations.
- Determine the number and type of volunteers needed for each project and identify potential sources of volunteers. Be mindful that all volunteer activities take place outside.
- Identify which partners are responsible for recruiting volunteers and managing them during their service. Identify training needs for volunteers and the person/group responsible for delivering training. (See the Additional Steps section of this blueprint for ideas about training.)
- Identify city services that will support the work of the partners and volunteers. For example, a city's water or stormwater department can identify safe access points to streams, provide advice on the best time of year to execute stream clean-ups, and identify flood zones where trees and rain gardens are most needed. They may also provide experienced staff on-site for volunteer projects, and be responsible for the monitoring and collection of metrics concerning the health of the waterway.





Develop a budget to cover materials and supplies. (See the Resources section of this blueprint for sample budget and materials lists.)

Create a project timeline, taking into consideration that projects may only be appropriate in certain months of the year. For example, in some areas of the country, the best time for tree planting and rain garden planting is November through March and the best time for water clean-ups is when the creeks are the lowest and without foliage. Consult with identified horticultural/climate experts to assist with this part of the planning process.

Develop a communications plan to mobilize, connect, and update the volunteers, giving particular attention to communications on the days leading up to volunteer service days.

ENGAGING VOLUNTEERS

Work with your partners to recruit volunteers based on the detailed scope of volunteer activities needed in each project. Environmental organizations, neighborhood groups, faith-based groups, youth and adult service organizations, local colleges, and corporate volunteers can be great partners for Storm Busters projects.

Volunteers can choose to serve in four different types of projects:

- **Tree plantings:** Tree planting is a great volunteer project for any age and ability level. Volunteers plant native, non-invasive shade trees during planting seasons in targeted neighborhoods and in public green spaces. Depending upon the size of the trees, 2-3 volunteers are needed at each site and tree plantings typically last between 45-90 minutes per tree.
- **Tree buddies:** Volunteers can also serve as ongoing “tree buddies” to care for and ensure the growth and health of the newly planted tree(s) for the first year (the most critical period of a tree’s life).
- **Rain garden plantings:** Rain gardens are shallow gardens planted with deep-rooted native plants and grasses designed to collect rainwater and allow it time to filter into the ground. Rain garden plantings are a little more strenuous and require a longer service time commitment compared to tree planting (i.e. 1-2 days per garden). Rain gardens are great group projects because it takes teamwork to accomplish the planting. Volunteers help design and plant rain gardens on residential and public properties in select areas where they will have the strongest stormwater mitigation impact, minimize erosion, and control drainage in flood-damaged areas.





- **Waterway clean-ups:** Waterway clean-ups are the most strenuous volunteer projects in Storm Busters due to the terrain, conditions, and potential weight of debris being removed. Volunteers identify critical areas and types of debris, then are trained and mobilized to remove debris in volunteer-friendly areas. They also plant native trees and remove invasive species along waterway banks.





MEASURING IMPACT

Collecting data on the impact of Storm Busters is essential for demonstrating results and partners are key to metrics collection. For example, a city's waste management department can assist with picking up and weighing trash and debris from waterway clean-ups, and the city's stormwater management department or similar agency can assist with measuring the mitigation of rainwater runoff.

The following outcome metrics must be collected:

Tree Plantings:

- Number of trees planted*
- Number of trees adopted and cared for
- Percentage of trees that survive the first year
- Amount of rainwater runoff mitigated

Rain Garden Plantings:

- Number of rain gardens planted*
- Total feet/acreage of rain gardens planted*
- Amount of rainwater runoff mitigated

Waterway Clean-ups:

- Feet /mileage/acreage of waterways assessed*
- Feet/mileage/acreage of waterways cleaned*
- Square footage/ acres of river banks restored by tree plantings and invasive species removal
- Increase in percentage of weight or volume of debris removed (based on the amount and type of debris, either weight or volume may be appropriate measurement units)

*These metrics can be collected on the day of the volunteer activity.

Additional metrics can be calculated using on-line tools. For example, <http://www.esf.edu/ere/endreny/gicalculator/RunoffHome.html> can be used to tally the total amount of storm-water runoff mitigated.





SECURING RESOURCES FOR STORM BUSTERS

You can secure most of the resources required for the volunteer projects via in-kind donations or at a discount. In exchange, you can provide visibility/sponsorship opportunities for local companies that provide materials. You can also request that volunteers bring tools with them to the volunteer site.

Trees and rain gardens: Ask a local landscape company or nursery to provide these materials and deliver them to the site location(s). The public works department or similar agency can also help with tree and rain garden deliveries. A hardware store, gardening center, or the city's parks department can provide tools and additional planting materials.

Waterway clean-ups: Garbage bags and gloves can be provided in-kind by a city's beautification or sanitation department or by the American River's National River Clean Up Program, <http://www.americanrivers.org/take-action/cleanup/organize/>, or by contacting Keep America Beautiful, www.kab.org.

Additional funding will be needed to support the management and execution of the project(s). There are a variety of state and national environmental grants available for these purposes, and local foundations and businesses may be interested in supporting this work.

RECOGNIZING AND THANKING VOLUNTEERS

There are many ways to recognize volunteers who contribute to making Storm Busters a success. Be welcoming and energized during training and throughout the course of the volunteer project. Following the project(s), send thank you notes and share pictures from the event(s). Get permission to include volunteers in future newsletters and thank them on social media.

Continue sharing photos of the growing trees, flourishing rain gardens, completed green roofs, and healthy waterways. Once the metrics have been finalized, share the impact with the volunteers. Create and share quarterly or semi-annual progress reports to help volunteers understand how their efforts contributed to the initiative's overall and long-term success on the environment and in the community.





ADDITIONAL STEPS THAT SUPPORT IMPLEMENTATION

There are several opportunities to further the impact of the projects in Storm Busters.

Organizations/city departments that can help with volunteer training include:

- The city's parks department can help train volunteers on planting trees and rain gardens
- A landscaping company/landscape architectural design company/nursery can also help with tree and rain garden planting
- The city's stormwater department or similar agency can train volunteers to help with waterway assessments and waterway clean-ups
- Local nonprofit organizations with missions focused on water may be able to provide guidance on waterway clean-ups, and potentially advise on tree plantings and rain garden plantings
- Local nonprofit organizations with missions focused on trees may be able to provide guidance on tree plantings and rain garden plantings

Schools are great sites for rain garden plantings as they can provide educational opportunities for students as well as improve the landscape of school campuses.

Working within neighborhoods is valuable because neighborhood residents who volunteer for Storm Busters are more likely to take ownership of long-term, ongoing maintenance of the trees, rain gardens, and/or streams. This is particularly true in neighborhoods that are more prone to flooding or that back-up to debris-ridden streams. (For more information on involving citizen volunteers in neighborhood revitalization efforts, please see the **Cities of Service** *Love Your Block* blueprint at <http://www.citiesofservice.org/resources>.)

Partner with a local university professor whose field of study is restoration of rivers and watersheds, to lead the waterway assessments. In addition to sharing knowledge and advice, he or she may bring along a team of enthusiastic college students to help with your efforts.





THE PLAN IN ACTION

 In May 2010, because 14 inches of rain fell in a two-day period, **Nashville** experienced a historic flood that brought devastation to the city's infrastructure and environment. Additionally, the powerful rains had flooded the city's rivers, streams, and creeks collecting and carrying materials (such as household construction, waste and woody debris) downstream. Even though the waters subsided, the remaining debris was blocked or buried in the waterways or distributed across abutting properties and fields. This debris was dangerous for the environment and to its citizens for the potential for erosion and water damage from build-up of sediment and silt.

As part of Nashville's recovery and restoration efforts, Mayor Karl Dean and Chief Service Officer Laurel Creech worked with its Water Department and community partners to identify ways to reduce the impact of future flooding, strengthen the city's stormwater management system, and prepare the city to be more resilient in the face of future natural disasters. Some of the solutions depended on water to be better dispersed and naturally absorbed.

Together with the mayor, the chief service officer outlined high-impact volunteer initiatives in the Impact Nashville Service Plan (http://www.nashville.gov/Portals/0/SiteContent/Volunteer/nashville_service_plan%20FINAL.pdf), including planting trees and rain gardens in flood-affected areas to help absorb and manage stormwater and to put in place a stronger natural absorption system for future rain events.

Since 2010, HandsOn Nashville, the Cumberland River Compact, and other local conservation organizations have planted more than 7,300 trees and 60 rain gardens across the city, mitigating well over 2.5 million gallons of stormwater. In addition, thousands of volunteers are working to restore Nashville's vast number of waterways. To date, volunteers have assessed more than 200 miles of waterways and cleaned 30 miles of waterways, removing nearly 300 tons of trash and debris. Funding to support the ongoing sustainability of these projects includes federal grants, support from the Nashville Tree Foundation, environmental grants and donations, and corporate sponsorships. Nashville citizens will continue to implement preventative measures in efforts to create a more resilient and healthy infrastructure for its citizens and the planet.





RESOURCES

SAMPLE MATERIALS LIST

Tree Plantings

non-invasive or native tree species of .5" caliber
tree delivery
gloves
tools: shovels, hoes, rakes
mulch and watering device

Rain Garden Plantings

rain garden plants
plant delivery
gloves
tools: shovels, hoes, rakes, hand trowels

Waterway Clean-ups

gloves
trash bags
trash/recycling bins/dumpsters
wader boots
kayaks, if needed





SAMPLE BUDGET

PROJECT TYPE	ITEM	UNIT PRICE	TOTAL PRICE	COMMENTS
Tree plantings	non-invasive trees (species of .5" caliber)	\$ 35	\$ 875	project includes 25 tree planting (price is based on 50% discount)
	tree delivery	\$ -	\$ -	donated by nursery, public works, parks department, or volunteer
	gloves	\$ -	\$ -	donated from beautification organization
	tools	\$ -	\$ -	donated from beautification organization or supplied by volunteers
	mulch and watering devices	\$ -	\$ -	donated from beautification organization or local hardware store
	project management			pre-planning, day of (each tree planting is approximately 30 minutes to 1 hour), and post data collection*
Rain Gardens	rain garden plants	\$ 125	\$ 500	rain garden requires several different type species and price depends on size of rain garden (sample quote is for 4 gardens of 20' X 10' each with 25 plants)
	plant delivery	\$ -	\$ -	donated by nursery, public works, parks department, or volunteer
	gloves	\$ -	\$ -	donated from beautification organization
	tools	\$ -	\$ -	donated from beautification organization or volunteers supplied
	project management			pre-planning, day of (assuming 2 hours for each rain garden, dependent on garden size), and post data collection*
Waterways	gloves	\$ -	\$ -	donated from beautification organization
	trash bags	\$ -	\$ -	donated from beautification organization
	trash/recycling bins	\$ -	\$ -	provided by waste hauler
	project management	\$ -	\$ -	pre-planning, day of (assuming 4 hours for each waterway clean-up, dependent on size and width of waterway), and post data collection*

* Cost depends on total number of hours.





ARTICLES AND WEBSITES

Center for Neighborhood Technology

- “The Value of Green Infrastructure: A Guide to Recognizing Its Economic, Environmental and Social Benefits”:
<http://www.cnt.org/repository/gi-values-guide.pdf>

American Rivers: www.AmericanRivers.org

- National River Cleanup Program for Tips on Organizing a River Clean-up:
<http://www.americanrivers.org/take-action/cleanup/organize/>
- Local Water Policy Innovation: A Road Map for Community-Based Stormwater Solutions: <http://www.americanrivers.org/newsroom/resources/local-water-policy-innovation-a-road-map-for-community-based-stormwater-solutions/>
- Permitting Green Infrastructure: A Guide to Improving Municipal Stormwater Permits and Protecting Water Quality:
<http://www.americanrivers.org/newsroom/resources/permitting-green-infrastructure-a-guide-to-improving-municipal-stormwater-permits-and-protecting-water-quality/>

University of Kentucky College of Agriculture

- Planting a Riparian Buffer:
<http://www2.ca.uky.edu/agc/pubs/id/id185/id185.pdf>

U.S. Department of Agriculture

- Chesapeake Bay Riparian Handbook:
http://www.chesapeakebay.net/content/publications/cbp_13019.pdf

City of Austin

- Watershed Protection Department, Rain Gardens Keeping Water on the Land: <http://www.austintexas.gov/raingardens>
- Earth Wise Guide to Rain Gardens: http://www.austintexas.gov/sites/default/files/files/Watershed/growgreen/raingarden_factsheet.pdf

Philadelphia Water Department

- How to Build a Rain Garden:
http://www.phillywatersheds.org/whats_in_it_for_you/residents/how-build-rain-garden





University of Connecticut

- Rain Garden Design Guide:
<http://nemo.uconn.edu/raingardens/>

North Carolina Cooperative Extension

- Building a Backyard Rain Garden:
<https://www.bae.ncsu.edu/topic/raingarden/Building.htm>

TOOLS FOR CALCULATING THE BENEFITS OF URBAN TREES

- **I-Tree**, www.itreetools.org, is a publicly-available software suite from the USDA Forestry Service that provides urban and community forestry analysis and benefits assessment tools to communities of all sizes as well as state forestry agencies, municipal foresters, nonprofit organizations, commercial arborists, environmental consultants, planners, and others interested in their community forests.
- **STRATUM** is a street tree management and analysis tool for urban forest managers that uses tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits: energy conservation, air quality improvement, CO2 reduction, stormwater control, and property value increase. For more information on STRATUM, see <http://www.fs.fed.us/psw/programs/uesd/uep/stratum.shtml>.





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- EN-POWER GROUP for their expertise.
- Stantec for their expertise.



Cities of Service is a national nonprofit that supports mayors to design and implement high-impact service strategies that can be replicated in cities worldwide. We provide technical assistance, programmatic support, planning resources, and funding opportunities. Founded by Michael R. Bloomberg, Cities of Service supports a coalition of approximately 200 cities whose mayors are committed to engaging citizen volunteers to solve local pressing challenges, from increasing high school graduation rates to improving energy efficiency in buildings. We help coalition cities share solutions, best practices, and lessons learned, as well as spread awareness about their great work.

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