



TOOL 4: PUBLIC INVESTMENT GUIDE

Greater Baltimore Wilderness Regional Resilience Green Infrastructure Network Local Implementation Toolkit



American Planning Association

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The Greater Baltimore Wilderness Coalition Coastal Resilience Project

The [Greater Baltimore Wilderness Coalition](#) is a voluntary alliance of public agencies, non-governmental organizations, professional associations, and conservation coalitions. The region it spans includes the area from the Chesapeake Bay on the east to the Piedmont in the west, and from Pennsylvania in the north to the suburbs of Washington, D.C., in the south. It includes the counties of Anne Arundel, Baltimore, Carroll, Harford, Howard, Montgomery, and Prince George's and the cities of Annapolis, Baltimore, Bowie, and others.

The goal of the resilience project is to develop a regional vision for climate resilience which will identify key green infrastructure investments across the Patapsco, Patuxent, and Gunpowder River watersheds. [The Conservation Fund](#) is leading the project team, with assistance from the [American Planning Association](#) (APA). Other team members include the [U.S. Geological Survey, Center for Chesapeake Communities](#), and [Chesapeake Conservancy](#).

About This Toolkit

This five-part toolkit is a companion to the Greater Baltimore Wilderness Region [Green Infrastructure Identification and Ranking](#) portal. The first tool presents a series of checklists to help planners and local officials evaluate the consistency of local plans and plan implementation methods with the opportunities for green infrastructure protection or enhancement highlighted in the portal. The second, third, and fourth tools provide guidance to help them begin the process of articulating policies and laying groundwork for action through locally adopted plans, land-use and development regulations, and public investments, respectively. The fifth, and final, tool briefly describes how three key private stakeholder groups can contribute to the implementation of the Greater Baltimore Wilderness Coalition's Regional Resilience Green Infrastructure Network.

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GREEN INFRASTRUCTURE IDENTIFICATION AND RANKING PORTAL

The Greater Baltimore Wilderness Region [Green Infrastructure Identification and Ranking](#) portal contains multiple data layers that collectively represent a Regional Resilience Green Infrastructure Network. This network is rooted in five green infrastructure strategies to maintain and increase regional resilience to coastal storms and other climate change impacts:

- **Protect Natural Resources Protection:** Preserve, restore, or enhance valuable and vulnerable land and water resources providing hazard mitigation and other co-benefits, including floodplains, wetlands, forest, stream systems, steep slopes, hydric and highly erodible soils, and important habitat areas.
- **Enhance and Restore Tree Canopy:** Maintain, enhance, and restore tree canopy in urban and suburban communities to reduce stormwater runoff, ameliorate the urban heat island effect, and improve air quality.
- **Implement Multi-Benefit Green Stormwater Infrastructure:** Retrofit developed areas to reduce impervious surfaces and incorporate best management practices (BMPs), such as bioretention areas, green streets, and green roofs in order to reduce vulnerability to flooding and associated pollution.
- **Protect Critical Infrastructure:** Use green infrastructure to buffer critical infrastructure from extreme weather impacts, including key transportation corridors, power production and transmission facilities, hospitals, and emergency management centers, water supply reservoirs, and wastewater treatment facilities.
- **Defend the Coast:** Preserve, restore or enhance natural habitat and introduce nature-based practices (e.g., living shorelines) to buffer coastal areas from impacts of coastal flooding, storm surge, and sea-level rise.

This network is a potentially important tool for enhancing resilience to coastal storms and climate change throughout the Baltimore region. However, the realization of its vision depends largely on the policies and actions of the individual counties and municipalities that govern the region.

Public investments are one of the primary tools that local jurisdictions use to help implement the policy recommendations contained in their plans (see Tool 2). There are a wide variety of public investments that affect the provision or protection of green infrastructure at multiple scales. Generally speaking, there are two broad categories for these investments: capital investments and programmatic investments.

Capital investments are major, nonrecurring expenditures on physical assets, including park development, infrastructure improvements, and land acquisition. Counties and municipalities list these capital investments in each annual capital budget and schedule them through a multiyear capital improvements program (CIP).

Programmatic investments are expenditures on intangible assets and activities, including resource management activities and various forms of constituent education and assistance, technical assistance, outreach and education, as well as programs that provide direct financial assistance or financial incentives. Direct financial assistance programs include rebates, grants, and loans. Financial incentives include tax credits.

Defining Green Infrastructure and Climate Resilience

Green infrastructure is our natural life support system—an interconnected network of forests, wetlands, waterways, floodplains, and other natural areas; parks, greenways, and other conservation lands; forests, ranches, and farms; and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources, and contribute to people's health and quality of life. At broad scales, it includes large blocks of forest, wetlands, stream networks, and other natural systems. Meanwhile, at local scales, smaller patches may be included, and at the site scale, green infrastructure may focus on natural or semi-natural solutions to reduce stormwater runoff or heat.

For purposes of this project, we use the term *climate resilience* to refer to the ability to resist or mitigate the negative impacts of the changing climate in Maryland's coastal zone, including watersheds that empty into the Chesapeake Bay. The negative effects primarily examined include rising sea levels, increased precipitation and corresponding increased stream flows and greater stormwater runoff, and coastal storm damage from wave erosion and storm surge. In looking to what services could be provided by green infrastructure—that is, natural features such as forests and wetlands as well bioengineered approaches, such as bioswales, rain gardens, and green streets—the project team focused on how green infrastructure could buffer or mitigate physical damage to communities, built infrastructure such as roads and hospitals, and ecosystem features themselves. These mitigating services are examples of *climate resilience*. The term *resilience* is also used to refer to social and economic factors that can determine how well specific populations or neighborhoods can weather and recover from significant climate-caused impacts. While some social and economic factors were included in our green infrastructure analysis, these aspects were not the primary focus of the project.

INVENTORYING EXISTING PUBLIC INVESTMENTS

It is not uncommon for a local government to make dozens or even hundreds of discrete investments in any given year that affect the use of green infrastructure to enhance community resilience. Some of these investments relate directly to the provision or protection of green infrastructure, while others have an indirect effect on the type and extent of green infrastructure in specific locations. In larger localities, staff from multiple departments may request and subsequently manage these investments, with or without formal mechanisms for coordination and review. Consequently, it makes sense for localities to inventory scheduled investments to identify potential gaps, redundancies, or conflicts. Inventorying investments and identifying gaps and redundancies can also help localities to maximize the benefits of their investments in green infrastructure and balance these benefits against the costs of providing and protecting green infrastructure.

Here are four common types of public investments in Greater Baltimore:

- **Capital Improvements:** The Capital Improvements Program (CIP) is a three- to six-year itemized schedule of capital projects, or major, nonrecurring expenditures on capital items (i.e., purchase or construction of related to facilities and infrastructure). The CIP is a powerful tool for implementing local plans and can be used to coordinate actions and investments across local departments and agencies. In support of green infrastructure, the CIP can be used for strategic investment in acquisition of conservation land to support the green infrastructure network. This can include fee-simple acquisition of conservation land; purchase of development rights; restoration or enhancement of watersheds, streams, or habitat on public land; and ongoing resource management or maintenance.
- **Direct Financial Assistance:** Local jurisdictions can provide direct financial assistance in the form of rebates, grants, and loans. Direct financial assistance programs can incentivize action through investment in financial assistance to property or business owners. Several jurisdictions in Greater Baltimore offer rebate programs that support tree planting or the installation of green stormwater infrastructure.
- **Financial Incentives:** Financial incentives, which include tax abatements and credits, can be useful tools for incentivizing conservation practices on private land. The state of Maryland has authorized local jurisdictions to grant property tax credits for conservation land held by a land trust (whether owned or under perpetual conservation easement) (Annotated Code of Maryland, Tax-Property, §9-220). Consequently, several jurisdictions in Greater Baltimore offer tax credits for land conservation.
- **Technical Assistance:** Technical assistance represents another form of public investment. Through technical assistance

programs, local jurisdictions provide non-financial assistance, such as training, site assessments, or toolkits, to home owners, business owners, and community groups. Some jurisdictions in Greater Baltimore offer technical assistance to help property owners or community-based organizations evaluate opportunities for larger scale green stormwater infrastructure projects.

- **Education and Outreach:** Education and outreach efforts help build awareness about issues, challenges, and actions that residents, business, and community groups can take. Investments in these efforts can help increase the adoption of practices that support the regional green infrastructure network vision. Several jurisdictions in Greater Baltimore have produced guidance materials or held workshops to help various community stakeholders understand how they can participate in ecological restoration, tree planting, or green stormwater infrastructure implementation.

While all of these public investments should correspond to line items in a locality’s annual budget, the budget itself may be insufficient to evaluate how these investments relate to each other or to the implementation of the locality’s green infrastructure goals.

At a minimum, a local inventory of green infrastructure-related investments should include the following:

- **Budget reference number:** Note the unique budget or CIP reference number for each investment.
- **Title of project or program:** Note the name of each capital project or programmatic effort the investment supports.
- **Size:** Note the dollar value of each investment.
- **Timing:** Note when each investment will be made.
- **Scope:** Summarize what each investment will pay for.
- **Relationship to policy:** Summarize how each investment relates to one or more local policy goals.
- **Project manager:** Note the department, agency, or official charged with managing each investment.

Through the process of compiling such an inventory, you may notice geographic areas or programmatic efforts where two or more investments have been scheduled. In some cases, these investments may be complementary; in other cases, investments may be redundant or even working at cross-purposes. Similarly, you may notice an unexpected absence of investment in one or more geographic areas or programmatic efforts. While some of these issues may be easily resolved by minor project adjustments, others will require a more holistic investment approach.

DEVELOPING A HOLISTIC INVESTMENT APPROACH

A holistic investment approach considers the cumulative effects of different public investments and ensures that all investments balance costs and benefits to the community, and are consistent with local plans, with each other, and with local land-use and development regulations. This consistency increases the likelihood of the jurisdiction making efficient progress toward its policy goals (see Tool 2). When your inventory reveals genuine investment gaps, new investments may be needed. However, the primary goals of taking a holistic approach are efficiency and efficacy, and not increased spending.



(Credit: American Planning Association)

Consistency with Local Plans

The CIP is a powerful tool for implementing local comprehensive, functional, and subarea plans. The CIP process identifies and schedules capital projects and these projects should be reviewed for consistency with the comprehensive plan. Aligning the CIP with the comprehensive plan demonstrates congruency with the overall local vision and goals and defines specific investments to meet those goals. For example, capital investments related to road construction or repairs may provide the opportunity to incorporate green stormwater infrastructure in the right-of-way. However, investments in roadways can also be at odds with green infrastructure goals in the plan, as they may bisect corridors or other key components of the green infrastructure network.

Programmatic investments should also be considered for alignment with the goals, objectives, and policy recommendations of local plans. Programmatic investments can support implementation of the local comprehensive plan, as well as implementation of local functional (e.g., green infrastructure, hazard mitigation, climate adaptation) and subarea (e.g., neighborhood, corridor, watershed) plans.

Requiring review of the CIP by the planning commission prior to approval by the city or county council can help increase consistency between the CIP and local plans. Communities can also increase consistency between plans and public investments by using project request forms that require staff to demonstrate a connection between a proposed project and the comprehensive plan.

Consistency Among Public Investments

In addition to being consistent with local plans, public investments should be consistent with one another in order to achieve mutually reinforcing outcomes and maximize benefits while using public resources efficiently. For example, when making capital investments in LID and BMPs, a locality may want to consider investment in a grant or rebate program to home owners to increase adoption of rain barrels, rain gardens, or other LID practices on private property. Additionally, localities should coordinate investments—for example, installation of a roadside bioswale with other scheduled improvements to the right-of-way.

In addition to evaluating opportunities for investments to achieve consistency in a mutually reinforcing way, localities should work to ensure that public investments are not working at cross-purposes. For example, tree canopy is an important component of a green infrastructure network. However, some trees can present hazards to critical infrastructure during extreme weather events. Investments in the tree canopy should consider and align with investments in critical infrastructure, so as not to pose additional risks to critical infrastructure.

Consistency with Regulations

Public investments should also be consistent with local land-use and development regulations. Public investments and local regulations can be mutually reinforcing or they can work at cross-purposes. For example, a local jurisdiction may provide direct financial assistance to home owners to adopt LID practices (i.e., rain gardens or bioswales) on their property, which help increase the benefits of LID standards. Alternately, public investments in conventional stormwater infrastructure may come into conflict with LID standards and related efforts to increase the adoption of green stormwater infrastructure.

Through both the CIP and annual budgeting processes, local jurisdictions can evaluate how proposed investments may be affected by local regulations. For site-specific projects, this includes evaluating how local land-use and development regulations for the site and adjacent sites may impact the investment. For communitywide investments, such as tree-planting programs, it involves looking at where an investment and local regulations may not be working in tandem.

ENHANCING CONSISTENCY WITH THE REGIONAL NETWORK

The “Public Investments” section of the Local Planning System Audit Tool (Tool 1) identifies four areas of public investment that are linked to the Greater Baltimore Wilderness Coalition’s Strategies to Increase Regional Resilience. Each of these topics corresponds with practices for protecting or enhancing the green infrastructure network and there are investments and activities associated with each that can be used by counties and municipalities to enhance consistency with the Regional Resilience Green Infrastructure Network.

Land Conservation in the Capital Improvement Program or Budget

Investments in land conservation include the fee-simple acquisition of undeveloped property, the purchase of development rights from land owners, and programmatic costs associated with managing public conservation lands to protect ecological functions.



The Bacon Ridge Natural Area in Anne Arundel County, Maryland, is protected by a conservation easement with Scenic Rivers Land Trust and the Maryland Environmental Trust. (Credit: Ted Weber, The Conservation Fund); volunteers planting trees at a farm near Fountain Rock Park in Walkersville, Maryland. (Credit: Chesapeake Bay Program (Tree Planting in Walkersville, Md., Flickr CC BY-NC 2.0))

This investment approach supports the following resilience strategies:

- **Natural Resources Protection:** Land conservation addresses the preservation of valuable natural resources. Investments in land conservation are focused on protecting land from development through fee simple acquisition, purchase of development rights, or assistance and incentives for natural resources conservation.
- **Critical Infrastructure Protection:** Protecting existing natural resources through land conservation is important to protecting built resources. Natural systems can buffer critical infrastructure from the impacts of flooding, coastal storms, and other extreme weather events.
- **Coastal Defense:** Preserving natural habitat plays an important role in buffering coastal areas from the effects of coastal flooding, storm surge, and sea-level rise. Investments in land conservation can preserve natural habitat and enhance coastal resilience.

Here are some recommendations for localities considering new land conservation investments:

- **Location:** Target investments in locally designated green infrastructure hubs or corridors or environmentally sensitive areas, state-designated areas of ecological significance, watersheds with less than 20 percent impervious surface cover, near critical infrastructure, and in coastal high hazard areas.
- **Timing:** For land acquisition or purchase of development rights, prioritize investments on parcels subject to immediate development pressures.

Trees in the Capital Improvement Program or Budget

Local jurisdictions often prioritize investment in the local tree canopy to meet tree canopy goals. These investments may include public tree-planting programs, as well as financial assistance and incentives to encourage tree planting on private land.

This investment approach supports the following resilience strategies:

- **Tree Canopy Enhancement and Restoration:** Trees play an important role in stormwater management, air quality, and ameliorating the urban heat island effect in urban and suburban communities. Programs that invest in the maintenance, enhancement, and restoration of the tree canopy can achieve tree canopy goals while providing broader environmental benefits.



A curb-cut bioretention cell in a church parking lot in Annapolis, Maryland; a restored wetland in Downs Park, Anne Arundel County, Maryland. (Credit: Ted Weber, The Conservation Fund)

- **Critical Infrastructure Protection:** Tree programs should consider critical infrastructure protection goals when targeting areas for investment. Green infrastructure can play an important role in protecting critical infrastructure, but some trees can also pose a hazard for power production and transmission infrastructure in the event of an extreme weather event. Tree programs should consider where tree canopy enhancement can play a role in protecting critical infrastructure and where maintenance is necessary to ensure trees do not pose an additional hazard in extreme weather events.

Here are some recommendations for localities considering new tree investments:

- **Location:** Target investments in locally designated green infrastructure hubs or corridors or environmentally sensitive areas, state-designated areas of ecological significance, watersheds that have more than five percent impervious surface cover or exceed nutrient loading limits, and areas near critical infrastructure.
- **Timing:** Schedule tree plantings in the fall or early spring. This will allow the trees to adjust to transplantation and begin growing roots before the hottest months of the year. Generally speaking, you should not plant trees in Greater Baltimore between mid-May and mid-September.

Stormwater Infrastructure in the Capital Improvement Program or Budget

Under Maryland's Stormwater Management Act all localities must use environmental site design (ESD) to the "maximum extent practicable" in stormwater management. ESD consists of site planning and stormwater management practices that mimic natural hydrology or otherwise attempt to minimize the rate and volume of stormwater flows into storm-sewer systems or neighboring parcels. When considering stormwater infrastructure improvements, ESD can be equated to low-impact development (LID) BMPs. Local jurisdictions may invest in implementing LID BMPs on public land or may provide assistance and incentives for implementation on private land.

This investment approach supports the following resilience strategies:

- **Multi-Benefit Green Stormwater Infrastructure:** Retrofitting already developed areas to include green stormwater infrastructure and incorporating green stormwater infrastructure into new development can reduce stormwater runoff and reduce vulnerability to flooding and associated pollution. Investments in LID BMPs, including bioretention areas, green streets, and green roofs, align with larger network goals while supporting multiple benefits.
- **Critical Infrastructure Protection:** Investing in LID BMPs reduces vulnerability to flooding. Critical infrastructure, including key transportation corridors, is often vulnerable to flooding. Strategic investment in LID BMPs can help protect critical infrastructure during extreme weather events.

Here are some recommendations for localities considering new LID investments:

- **Location:** Target investments in locally designated green infrastructure hubs or corridors or environmentally sensitive areas, watersheds that have more than five percent impervious surface cover or exceed nutrient loading limits, and areas near critical infrastructure.
- **Timing:** Look for opportunities to coordinate LID projects on public land with other capital improvement projects, such as street resurfacing, public facility rehabilitation, or park beautification projects. This can minimize service disruptions and often results in cost savings over sequential projects.

Ecological Restoration or Enhancement in the Capital Improvement Program or Budget

Local jurisdictions can invest in the restoration or enhancement of forests, wetlands, watersheds, and coastal habitats. Investments in restoration and enhancement activity include investments on public and private land.

This investment approach supports the following resilience strategy:

- **Natural Resource Protection:** Investments in ecological restoration or enhancement of natural areas are an investment not only in resource protection, but also in hazard mitigation and resiliency.

Here are some recommendations for localities considering new ecological restoration or enhancement investments:

- **Location:** Localities looking to invest in ecological restoration or enhancement should consider targeting investments in locally designated green infrastructure hubs or corridors or environmentally sensitive areas, watersheds that have more than five percent impervious surface cover or exceed nutrient loading limits, near critical infrastructure, and in coastal high-hazard areas.
- **Timing:** For in-stream restoration or enhancement projects, avoid scheduling work during stream closure periods. You cannot work in Class I and Class I-P Waters from March 1 through June 15, Class II Waters from June 1 through September 30 or December 16 through March 14, Class III and Class III-P Waters from October 1 through April 30, or Class IV and Class IV-P Waters from March 1 through May 31 (Code of Maryland Regulations §26.08.02.11.B(4)(f)).

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