TOOL 2: PLANNING 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:** 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 surface and incorporate best management practices 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. While the first tool in this series can help local planners and officials evaluate the extent to which the existing planning system in their respective jurisdictions conforms with the regional network, this second tool is intended to help them begin the process of articulating policies and laying groundwork for action through locally adopted plans.

Local governments use plans to define collective goals, objectives, and related implementation actions, and these plans serve as a framework to guide local decisions about regulations and public investments. As such, local plans are an important component of any effort to systematically address local green infrastructure priorities and enhance consistency with the Greater Baltimore Wilderness Regional Resilience Green Infrastructure Network.

There are three general categories of local plans: comprehensive plans, functional plans, and subarea plans. The comprehensive plan, also referred to as general or master plan, addresses a broad range of topics and establishes a framework to guide decision making for the next 20 to 30 years. Functional plans, which can include green infrastructure, open space, hazard mitigation, and climate adaptation plans, address a specific system or special topic area. Subarea plans, which include plans for specific neighborhoods, corridors, or watersheds, address a specific subarea of the municipality or county.

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. At local scales, smaller patches may be included, and at the site scale, green infrastructure may focus on natural or seminatural 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, raingardens, 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 PLANS

Local governments often address green infrastructure and related considerations across multiple plans at different scales. Plans may address green infrastructure and natural systems directly, or may address them indirectly through goals, objectives, and policy recommendations related to open space, conservation, water resources, and other related topics. In larger localities, staff from multiple departments may be charged with leading various planning processes, with or without formal mechanisms for coordination and review. Consequently, it makes sense for localities to inventory all plans to identify potential gaps or conflicts.

Here are the three basic types of local plans:

- **Comprehensive Plans:** Maryland requires local comprehensive plans (Annotated Code of Maryland, Land Use, §3-101). Jurisdictions are required to review the comprehensive plan on a six-year schedule and make updates as necessary. Comprehensive plans have required elements, including goals and objectives, land use, transportation, community facilities, development regulations, areas of critical state concern, sensitive areas, water resources, and development capacity analysis, and which may include fisheries, mineral resources, and municipal growth. Plans may also include natural resources, conservation, flood control, and priority preservation area elements (Annotated Code of Maryland, Land Use, §3-102). Comprehensive plans across Greater Baltimore address green infrastructure and related considerations through multiple required or permissive elements.
- **Functional Plans:** Counties and municipalities adopt functional plans to address a wide range of specific topics. Many different functional plans may directly or indirectly address green infrastructure. These include green infrastructure plans, parks and open space plans, hazard mitigation plans, climate action plans, and sustainability plans. Several localities in Greater Baltimore have adopted green infrastructure plans that define a network of green infrastructure hubs and corridors and articulate goals and actions to protect or enhance that network. Across Greater Baltimore, counties and municipalities have also adopted functional plans focused on sustainability, climate action, hazard mitigation, and land preservation. These plans may have goals, objectives, and policy recommendations that address the role that natural systems can play in mitigating both climate change and hazards, while also recognizing that these systems need to be maintained so as not to pose a risk during hazard events.
- **Subarea Plans:** Subarea plans are used to address specific geographic areas of a jurisdiction, such as a neighborhood, corridor, or downtown. As such, localities can use these plans to address green infrastructure related considerations for a defined subarea of a jurisdiction. Across Greater Baltimore, there are examples of subarea plans that directly and indirectly address green infrastructure. These include sector plans, neighborhood or small area plans, corridor plans, and watershed plans. Sector, small area, and corridor plans may include recommendations for the provision and protection of parks, open space, and natural features, as well as provisions for tree canopy and environmental site design. Meanwhile, watershed plans typically address

specific watershed conditions and may also include strategies, such as tree planting, rain gardens, and stream restoration, to meet National Pollutant Discharge Elimination System Requirements or other regulatory requirements.

Because counties and municipalities adopt different types of plans at different times and for different purposes, there is always a risk that one or more plans may contain conflicting background information or policy recommendations.

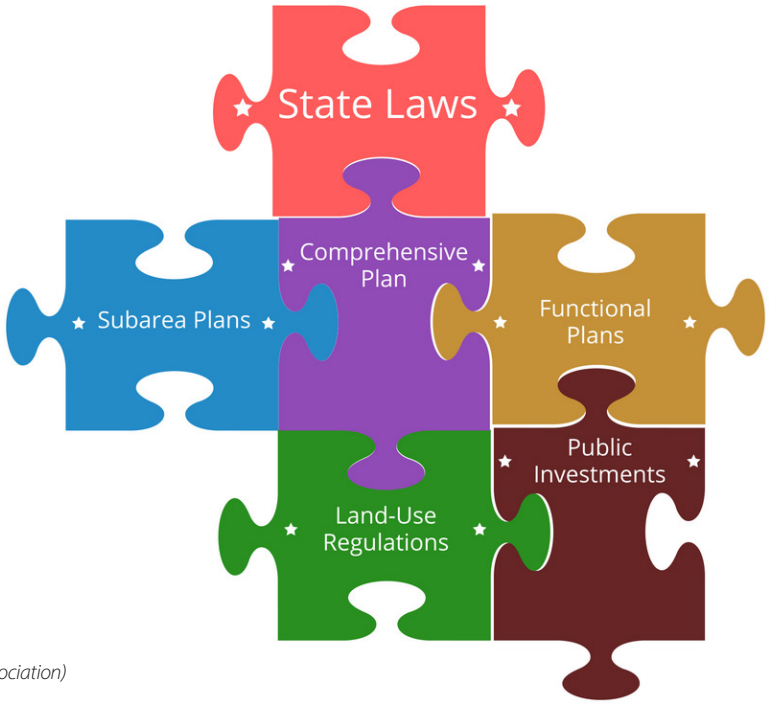
At a minimum, a local inventory of green infrastructure-related plans should include the following:

- **Title:** Note the official name of each plan.
- **Scope:** Note the geographic extent and topics addressed by each plan.
- **Relationship to Comprehensive Plan:** Note whether or not each plan is the official local comprehensive plan or adopted by reference into the local comprehensive plan.
- **Dates of Adoption and Last Review:** Note the dates of initial adoption and most recent amendment for each plan.
- **Summary of Background Information:** Summarize the relevant maps and topical discussions for each plan.
- **Summary of Policy Recommendations:** Summarize the relevant policy recommendations for each plan.
- **Implementation Responsibility:** Note the departments, agencies, or officials charged with implementing the relevant policy recommendations for each plan.

Through the process of compiling such an inventory, you may notice geographic areas or scenarios where two or more plans apply. In some cases, these plans may be complementary; in other cases, background information or plan recommendations may be contradictory. Similarly, you may notice topics or scenarios that seem to be unintentionally excluded from one or more plans. While some of these issues may be easily resolved by minor plan amendments, others will require a more holistic planning approach.

DEVELOPING A HOLISTIC PLANNING APPROACH

A holistic planning approach considers the cumulative effects of different locally adopted plans and ensures that all plans and associated implementation mechanisms are consistent with applicable state statutes and regulations, internally consistent, and consistent with each other. This consistency creates a clear policy direction for the local jurisdiction and increases the likelihood of the jurisdiction making efficient progress toward its policy goals.



(Credit: American Planning Association)

Consistency with State Laws and Regulations

Plans that address green infrastructure should be consistent with all applicable state laws. The Maryland Department of Planning reviews local comprehensive plans for consistency with applicable laws, including the Land Use Article, Economic Growth Resource Protection and Planning Act of 1992, the 1997 Priority Funding Areas Act, and the requirements of the 2006 planning legislation (HB 1141 and HB 2). Together, these make up Maryland's smart growth and growth management laws. In addition to being consistent with the smart growth and growth management laws, the local comprehensive plan and other local plans should comply with the requirements of state statutes and regulations related to local forest conservation, stormwater management, and Chesapeake Bay watershed improvement programs, among others.

Internal Consistency

Establishing internal consistency within plans is also important to a holistic planning approach. Within comprehensive plans, goals and policy recommendations should work as a mutually reinforcing system across plan elements. When addressing green infrastructure comprehensive plans in Maryland, there is potential for inconsistency within the required elements of critical state concern, sensitive areas, and water resources elements, and the land use, municipal growth, and development capacity analysis. For example, a community may look at greenfield sites for potential future growth and residential development. However, greenfield development may come into conflict with local conservation or green infrastructure network goals.

Goals and policy recommendations in functional plans may also be at odds with each other. For example, a tree canopy goal in a climate adaptation plan may be in conflict with recommendations related to protecting powerlines during an extreme weather event. In subarea plans, goals related to development density may come into conflict with goals related to providing GSI on site.

Consistency Among Plans

In addition to evaluating plans for internal consistency, a holistic planning approach looks at consistency among plans. Local jurisdictions should ensure that green infrastructure goals and policies are integrated into the elements of the comprehensive plan and related functional and subarea plans. Goals and policy recommendations introduced in the comprehensive plan should be advanced by functional and subarea plans. It is important to ensure that updates to functional and subarea plans reflect consistency with comprehensive plan. The comprehensive plan should also reference functional and subarea plans in support of goals and policy recommendations. Consistency among plans amplifies the goals and policy recommendations and can be important to successful implementation of local plans.

Consistency of Plans, Regulations, and Public Investments

A holistic planning approach goes beyond the plans themselves. It addresses other points in the planning process, including local regulations (see Tool 3) and public investments (see Tool 4). Local regulations and public investments—both capital investments and programmatic investments—should be addressed in the plan's implementation section. Without consistent implementation through local regulations and public investments, plans may produce results that are inconsistent with or even contrary to the stated policy goals.

Local land-use and development regulations, including zoning and subdivision regulations, play an important role in implementing the policy recommendations in local plans. Furthermore, the state of Maryland requires that zoning regulations and associated decisions controlling the timing, location, and nature of development be consistent with and work to further the comprehensive plan (Annotated Code of Maryland, Land Use, §1-303).

Meanwhile, it is equally important for localities to bring anticipated capital and programmatic investments into alignment with the policy recommendations and implementation actions in their plans.

ENHANCING CONSISTENCY WITH THE REGIONAL NETWORK

The "Plans" section of the Local Planning System Audit Tool (Tool 1) identifies eight planning topics that have strong connections to the Greater Baltimore Wilderness Coalition's Green Infrastructure Strategies to Increase Regional Resilience. Across these topics there are some general principles for local plan background information and policy recommendations that can help realize the vision of the regional network.

From top, left to right: Wetland grasses and forested areas near a tidal creek in Anne Arundel County, Maryland; tree canopy in Annapolis, Maryland; a large rain garden at a library in Annapolis, Maryland; a hospital near a forested tidal floodplain in Annapolis, Maryland; a new living shoreline at the Annapolis Maritime Museum in Annapolis, Maryland. (© Credit: Ted Weber, The Conservation Fund)

Maps and Descriptions

Plans provide an overview of existing conditions and look at future trends, establishing a fact base for the jurisdiction's policy recommendations. To bring local plans into closer alignment with the regional network, plans should include background information related to natural resources, tree canopy, GSI, critical infrastructure, and coastal habitat and high-hazard areas. This can include both maps and descriptions of a green infrastructure networks or related elements (e.g., existing LID sites, tree canopy, etc.), as well as state-designated areas of ecological significance (e.g., Maryland's Targeted Ecological Areas within the jurisdiction, Maryland's Forests of Recognized Importance within the region, etc.), and locally designated environmentally sensitive areas (e.g., floodplains, steep slopes, buffered stream corridors, etc.).

Policy Recommendations for Natural Resource Protection

Localities can include policy guidance related to the preservation, restoration, and enhancement of natural resource protection in comprehensive, functional, and subarea plans. Local plans can align with the natural resource protection strategy by adopting policies that discourage new development in designated green infrastructure hubs and corridors, areas of ecological significance, and environmentally sensitive areas. Natural resource protection can also be supported by policy recommendations that protect existing forest cover and discourage the development of additional impervious surfaces within one or more watersheds.

Policy Recommendations for Tree Canopy Enhancement and Restoration

Maintaining, enhancing, and restoring tree canopy is a priority in many communities, and enhanced and restored tree canopy can have a range of benefits, including reduced stormwater runoff and improved air quality. Local plans can increase alignment with the tree canopy enhancement and restoration strategy by establishing local tree canopy goals and including policies to support the planting of trees on both public and private lands. Tree canopy policies can also address equity considerations by targeting tree planting efforts in areas with high concentrations of vulnerable populations.

Policy Recommendations for Multi-Benefit Green Stormwater Infrastructure

Localities can align their plans with this strategy by including goals and policy guidance related to multi-benefit GSI, including bioretention areas, green streets, and green roofs, which can work to reduce stormwater runoff and vulnerability to flooding, in their comprehensive plans and related functional plans, and can address specific sites and projects through their subarea plans. Local plans can increase alignment with the multi-benefit GSI approach by including recommendations for implementing low-impact development (LID) on suitable sites based on ecosystem value. LID refers to techniques, including rain gardens, bioswales, green roofs, and permeable pavement, which help capture and treat stormwater at its source and mimic predevelopment hydrology. LID is likely to have the maximum effect on resilience for sites within the 100- or 500-year floodplain, in areas with steep slopes or highly erodible soil, or in watersheds that have high impervious surface cover or exceed permissible nutrient loading levels. Policies should address opportunities for implementation of LID on both public and private property.

Policy Recommendations for Critical Infrastructure Protection

Local plans can address the role of green infrastructure in protecting critical infrastructure from the impacts of extreme weather events. Comprehensive plans can include goals and policy guidance, while functional plans (e.g., hazard mitigation, utilities) can provide additional specificity on goals, policies, and implementation actions. Subarea plans may address specific sites. Plans can increase alignment with the critical infrastructure provision strategy by including policy guidance that directly connects green infrastructure provision to the protection of critical infrastructure, particularly during extreme weather events. This may include identifying critical infrastructure sites and linear critical infrastructure, looking at how it overlaps with green infrastructure assets, and including policy recommendations related to protecting and restoring green infrastructure near critical infrastructure.

Policy Recommendations for Coastal Defense

Coastal areas are important parts of green infrastructure networks. Localities can address this strategy by including goals and policy recommendations related both to preserving and restoring natural habitat and systems and to introducing nature-based practices. Together, these practices can play a role in reducing the impacts of storm surge, coastal flooding, and sea-level rise. Local comprehensive, functional, and subarea plans can increase alignment with this strategy of the network vision by including goals and policy recommendations that specifically address the protection of coastal habitat, including forests, marshes, dunes, underwater grasses, and oyster reefs. They can also include goals and policies related to protecting high-hazard shoreline areas, including protecting,

restoring, and creating habitat, as well as addressing state-designated areas or ecologically significant Maryland Blue Infrastructure Priority Watersheds. Policy recommendations that address habitat protection and restoration, and the creation of living shorelines should address both public and private property.

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