

Targeting Chesapeake Resources to Achieve Multiple Outcomes and Local Benefits Executive Summary

- The Chesapeake Bay Program (CBP) needs to accelerate progress on almost a quarter of outcomes in the Chesapeake Watershed Agreement while maintaining progress on the remaining ones. (See [Chesapeake Progress](#)).
- The CBP partnership spends about \$1.2B annually on activities toward achieving the Watershed Agreement, with a focus on water-quality improvement. Recent funding increases, including the Bipartisan Infrastructure Law, provide additional opportunities to accelerate progress toward multiple outcomes and improve state and local benefits.
- However, a more comprehensive approach to target resources, including funding increases, is needed to identify the places and approaches to more effectively advance multiple outcomes and benefits.
- The USGS is working with the CBP Office, USEPA, NOAA, and the Chesapeake Conservancy to provide science-based information that can be considered by agencies and organizations for a more strategic approach to targeting resources.
- The objective of this effort is to organize science-based information so agencies and organizations can better target resources to the places, and towards the types of activities, that accelerate progress for multiple CBP outcomes and provide more local benefits. The information is organized around several topics (figure 1) based on the goals of the Chesapeake Watershed Agreement: (1) accelerate water-quality improvements, (2) improve fish, wildlife populations and habitats, (3) expand land-conservation efforts, and (4) increase benefits to people, with all topics considering opportunities to enhance climate resiliency.
- Enhanced targeting of resources will accelerate progress toward multiple CBP outcomes and increase the return on funding investments by providing more benefits to the people, fish, and wildlife across the Bay and its watershed.

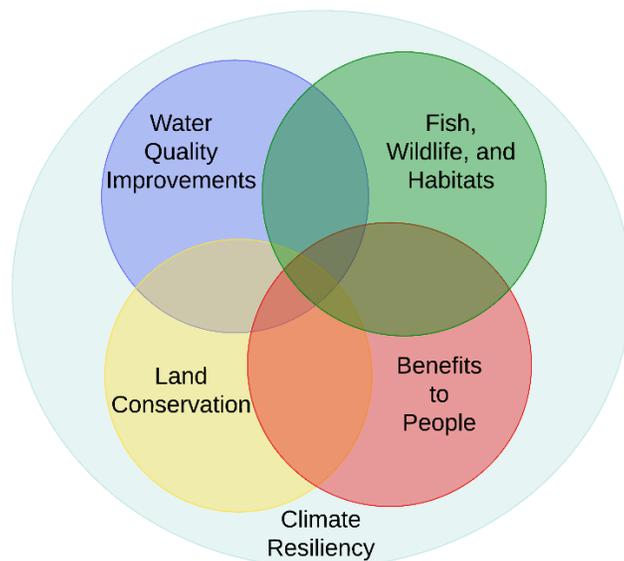


Figure 1: Agencies and organizations, working in collaboration with the CBP partnership, can use tools and approaches to target funding to address multiple topics (water quality; fish, wildlife, and habitat; land conservation; and benefits to people). Addressing two or more topics will accelerate progress toward multiple CBP goals and outcomes and provide more local benefits.

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[Need and objectives for enhanced targeting of Chesapeake resources](#)

The Chesapeake Bay Program (CBP) needs to accelerate progress on almost a quarter of outcomes in the Chesapeake Watershed Agreement; and maintain progress on the remaining ones. (See [Chesapeake Progress](#)). The CBP partnership spends about \$1.2B annually on activities toward achieving the Watershed Agreement, with a focus on water-quality improvement. Recent funding increases, including the Bipartisan Infrastructure Law, provide additional opportunities to accelerate progress toward multiple outcomes and improve state and local benefits. However, a more comprehensive approach to target resources, including funding increases, is needed to identify the places, practices, and policies to more effectively advance multiple outcomes and benefits. Therefore, the USGS is working with the CBP GIS Team and other CBP partners to provide science-based information that can be considered by agencies and organizations for a more strategic approach to targeting resources.

The USGS has initiated an effort with the CBP GIS team and other partners to provide more comprehensive information for partners to target resources. The partners involved in the effort currently including the USEPA (CBP office, Office of Research and Development, and Region 3), NOAA, and the Chesapeake Conservancy.

The objective is to organize science-based information so agencies and organizations can better target resources to the places, and towards the types of activities, that accelerate progress for multiple CBP outcomes and provide more local benefits. The information is organized around several topics (figure 1) based on the goals of the Chesapeake Watershed Agreement: (1) accelerate water-quality improvements, (2) improve fish, wildlife populations and habitats, (3) expand land-conservation efforts, and (4) increase benefits to people, with all considering climate resiliency (figure 1).

The results can be used by agencies and organizations to target resources, working in collaboration with CBP GITs (figure 2) and workgroups to address the CBP outcomes. The GITs consist of federal, state, and NGOs members who are collaborating on specific outcomes, and member agencies can use information on targeting resources to accelerate progress and provide benefits to multiple outcomes. The use of the findings will vary by the type of stakeholders:

- Federal agencies could use the tools to identify places where resources could be focused across the watershed that address multiple CBP outcomes. Federal agencies could then work with states and local governments to further identify opportunities in these places.
- State governments could use the regional information, along with their existing state tools, to identify places where progress can be made on multiple CBP outcomes while simultaneously achieving state priorities.
- Local governments would like the investments being made to improve water quality and achieve other CBP outcomes to also provide local benefits for their communities.
- NGOs could use the watershed-wide tools to supplement their own maps and targeting tools to improve local watershed conditions.

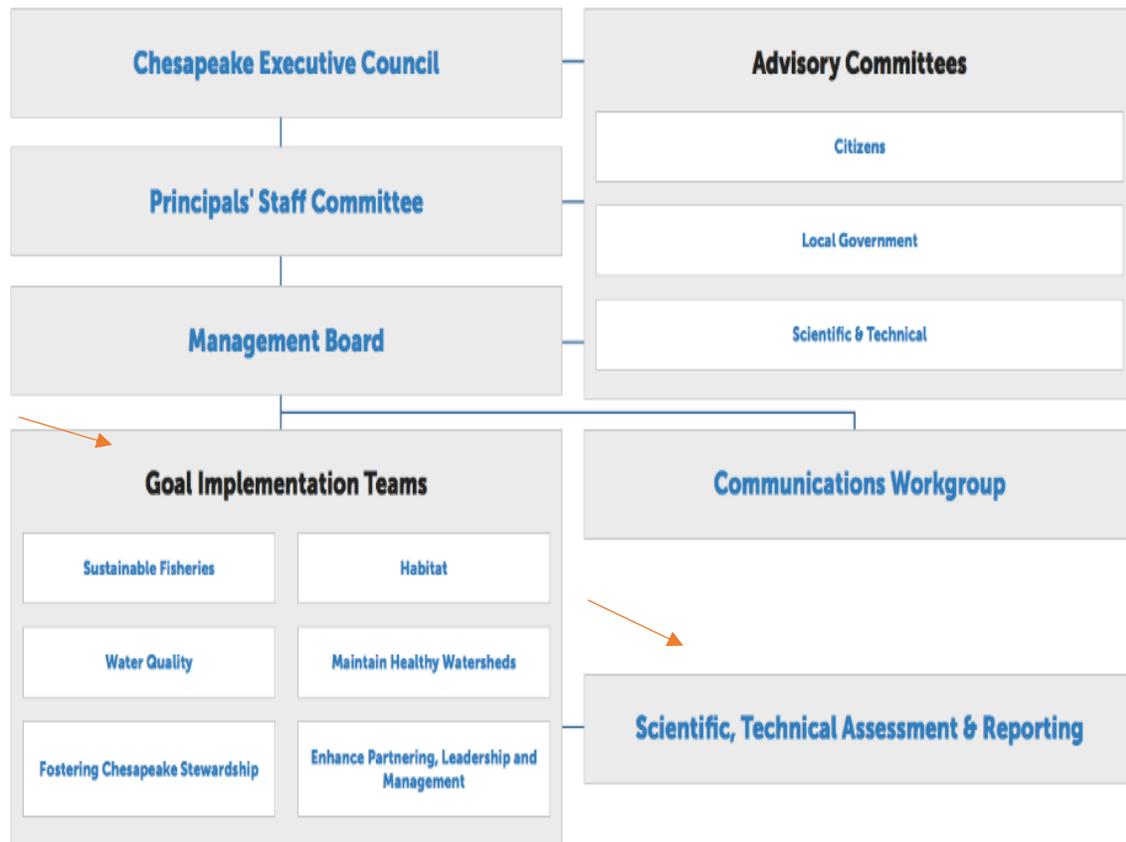


Figure 2: Agencies and organizations overseeing funding, and the Goal Implementation Teams and their workgroups would be the primary stakeholders to apply the targeting information. The STAR team could be used to facilitate the discussions, which would be led by USGS and other science providers.

Topic 1: Accelerate water-quality improvements

- **Need:** The CBP partnership is behind for meeting the 2025 mandate of the Bay TMDL and needs to accelerate progress toward implementing nutrient and sediment practices to improve water quality in the Bay. The USEPA, NRCS, and the states, working through the CBP Water-Quality GIT, need improved information on where (and what practices) to target funding to accelerate implementation of nutrient-and sediment-reduction practices, with an emphasis on agricultural lands. Current efforts are focused on implementing practices to improve the deeper waters of the Bay where dissolved-oxygen conditions are the worst.

There are opportunities for additional benefits from these water-quality practices, including (1) improving local water quality, (2) having more emphases on improving fish and wildlife populations, and their associated habitat conditions, and (3) improved climate resiliency (such as flood mitigation and slowing rising temperatures) throughout the watershed.

- *Selected existing tools and efforts that can be used target resources:*
 - Most Effective Basins map. Identifies places to focus nutrient and sediment reductions practices to improve water-quality in the mainstem of the Bay. These maps are being used to focus EPA CBP funding and grants.
 - Targeting tools have been developed to help identify priority places for watershed grants. The National Fish and Wildlife Federation (NFWF) administers the Chesapeake Small Watershed Grants. These grants, supported by USEPA and NFWF, focus on both water quality improvements and habitat benefits.
 - Priority Agricultural Watersheds map: This tool was developed to help to identify places where nutrient and sediment reductions would provide load reductions to the Bay and benefit local water quality. Figure 3 provides an example of places in each state where practices could be focused to get the largest reduction of nitrogen loading to the Bay and benefit local water quality.
 - Watershed Data Dashboard: provide multiple maps and data for water-quality improvement decisions, as well as potential benefits to other CBP outcomes.
 - Chesapeake Assessment Scenario Tool (CAST): Allows users to quantify nutrient and sediment reductions from specific management practice and land-use change scenarios.

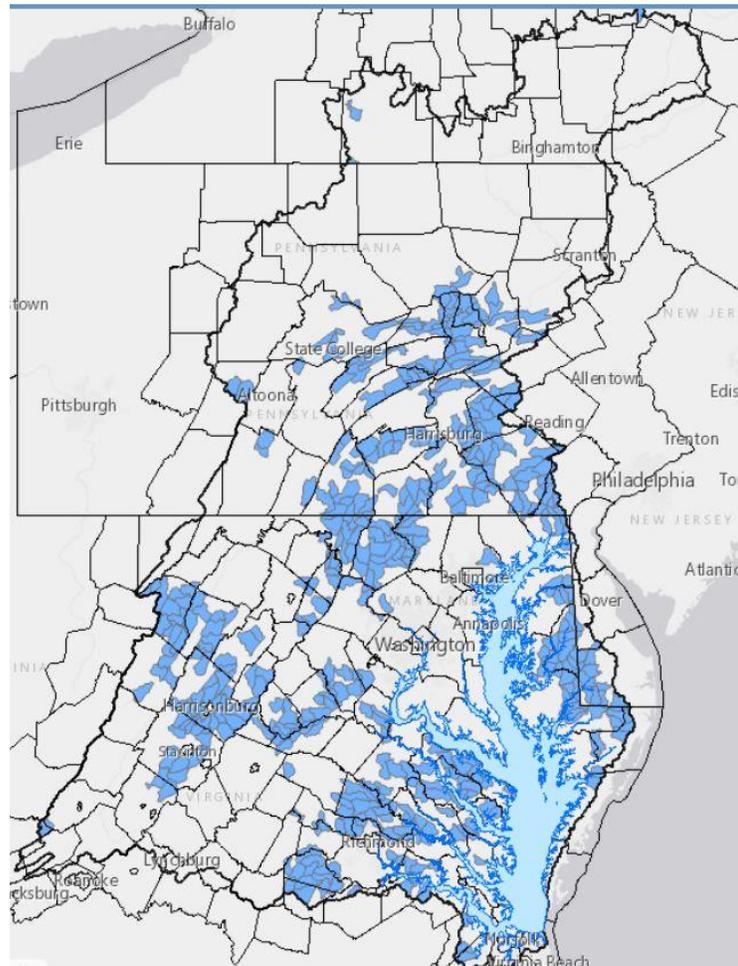


Figure 3. Ranking by states for places to get the highest reduction of nitrogen loading to the Bay and local water-quality improvements (from the Chesapeake Priority Agricultural Watersheds tool).

- *Potential opportunities to further targeting and enhance tools:*
 - Have states and local governments use tools to identify how practices in the Phase 3 Watershed Implementations Plans (WIPs) can also address local water-quality impairments.
 - Have EPA, NRCS, and states discuss how the new BIL funding can be used to accelerate water-quality improvements in tidal waters occupied by recreational and commercial fisheries. These would include the shallow and open waters most important for SAV, crabs, oysters, and recreational fisheries, as well as swimming and boating.
 - Advance the recommendations of the joint EPA-NRCS-USGS effort to coordinate water-quality improvement programs to reduce nutrients and sediment to the Bay while improving local waters.
 - Apply upcoming results of ecological services studies (conducted by USEPA Office of Research and Development) into CAST to improve information on selected water-quality practices for additional benefits local communicates.
 - Utilize new higher-resolution land cover, use, and change data to further focus implementation of practices.
 - Encourage the Water Quality GITs and funding partners to interact with other GITs on additional benefits (see other topics of paper)
 - Increase GIS and technical support for application and improving the tools for targeting.

Topic 2: Improve fish, wildlife, and their habitats.

- *Need:* The CBP has inter-related goals to sustain fisheries, restore vital habitat, and improve water quality in the estuary and watershed. Several outcomes of these goals are behind, including riparian forest buffers and wetlands. To accelerate progress, tools that exist for individual outcomes (table 1) need to be enhanced and integrated to highlight how practices and specific places can address multiple outcomes for fisheries, habitats, and water-quality. There are opportunities to apply BIL funding to advance multiple outcomes and achieve local benefits.
- *Selected existing tools and efforts that can used for targeting resources:*
 - Have partners apply existing tools to accelerate progress toward wetlands and riparian buffers outcomes. Opportunities include upcoming CBP workshops to enhance state and federal efforts for forest and wetland outcomes.
 - The small watershed grants, overseen by NFWF, currently emphasize dual benefits for projects that address both water-quality improvements and habitat restoration. The recent NFWF guidance was updated to include new fundings from the Chesapeake Watershed Investments for Landscape Defense (WILD) program.
 - The Chesapeake GITs collaborated on a map showing places where habitat and water quality outcomes could be met (Figure 4).
- *Potential opportunities to further targeting and enhance tools*
 - Work with the USFWS to enhance data for next years' Chesapeake (WILD) program. There are opportunities to expand the USFWS Natures Network data to include new results on freshwater and tidal fisheries being produced by USGS and NOAA respectively.

- Utilize and integrate the upcoming data about the vulnerability of coastal areas to sea-level rise, including findings on wetlands, waterbird habitat, and infrastructure. New data are being produced by NOAA, USGS, and VIMS.
- Use findings from the Chesapeake Conservancy effort on cross-goal team mapping and new upcoming data for improved, watershed-wide information and tools for stream health, brook trout, freshwater fisheries, and wildlife. The results can be used collaboratively by the Habitat, Fisheries and Water Quality GITs and partners.
- Apply and enhance the USGS Chesapeake Land-Change Model to inform vulnerability of habitats under different climate and land-use scenarios.

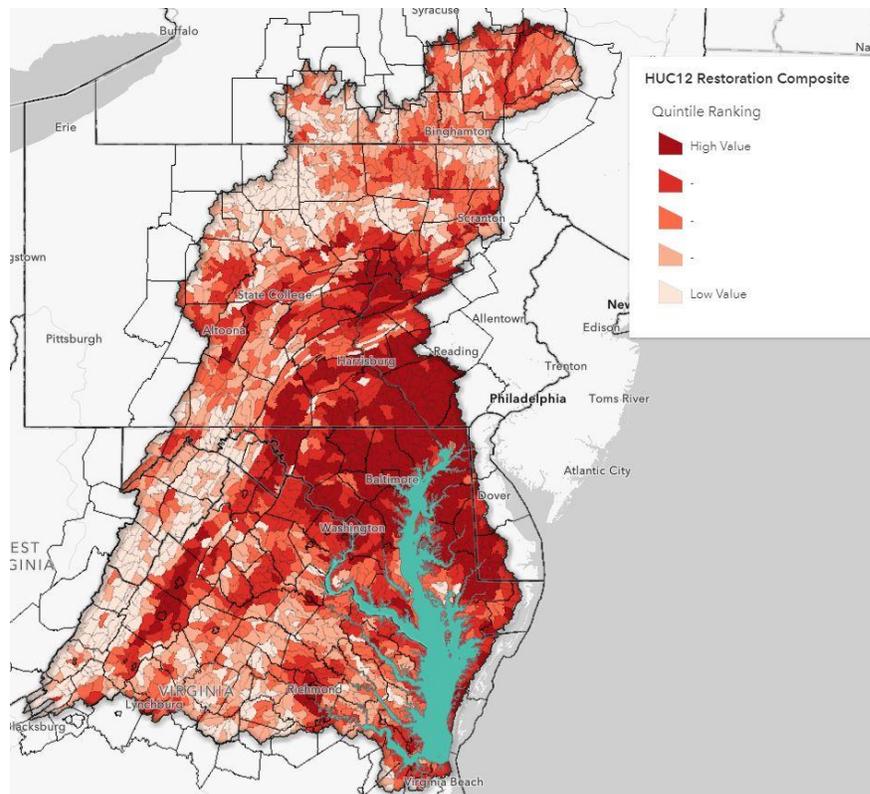


Figure 4 shows the composite restoration map of places where multiple outcomes can be met for water-quality improvements, toxic contaminants, and habitat connectivity. These outcomes were selected by the GITs.

Topic 3: Expand Land Conservation

- **Need:** The Chesapeake Conservation Partnership (CCP), led by the National Park Service and the Chesapeake Conservancy, is working to expand land protection and conservation. The CCP is striving to have 30 percent of the watershed conserved by 2030, building from CBP outcomes for land protection and healthy watersheds. Enhanced land protection could be supported by existing resources and new funds being considered for the BIL and America the Beautiful (AtB) initiative. The CCP and the Healthy Watershed GIT need information at the parcel scale to inform locally led land-protection opportunities, improve tracking of land protection, and consider the effects of land and climate change.

- *Selected existing tools that can be used to target resources:*
 - Each state identified places shown on Chesapeake Healthy watersheds map (figure 5), that the Healthy Watershed GIT is working to maintain.
 - Chesapeake Conservation Atlas: identifies protection opportunities for forests, habitats, productive farmlands, heritage resources and human health.
 - Watershed Data Dashboard: includes scenarios for different land policy and conservation decisions (based on USGS land-change model)
 - The Chesapeake Healthy Watersheds Assessment: provide watershed characteristics that can be considered for vulnerability toward climate and land change.
- *Potential opportunities to further targeting and enhance tools*
 - Use the new high-resolution land-use and change data, produced by the Chesapeake Conservancy and USGS, to inform more local land protection efforts.
 - Better align efforts to support a national Conservation Atlas (under AtB) with updates being considered for the CCP Chesapeake conservation atlas.
 - Explore opportunities to use results from Chesapeake Healthy Watersheds Assessment for the updated Conservation Atlas.
 - Integrate the USGS land change model into the CCP decisions to identify the most vulnerable areas to development to help target land protection.
 - Coordinate with CCP to leverage the USGS land-change model to visualize conserving 30 percent of land in the watershed under different land-use scenarios.
 - Improve automated tracking of protected areas.

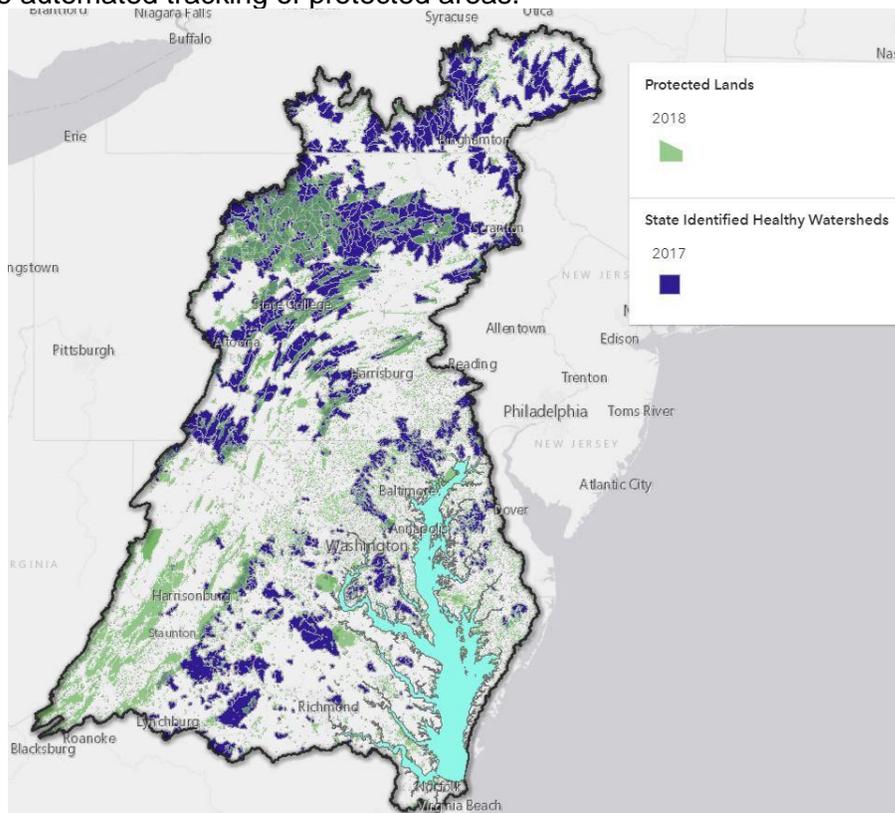


Figure 5: shows the areas each the states consider a healthy watershed (in blue). The areas in green have been protected through state, federal, and NGO efforts, many led through the Chesapeake Conservation Partnership.

Topic 4: Increase benefits to people

- *Need:* The CBP Agreement has several goals to benefit people and increase involvement of people: Stewardship, Environmental Literacy, and Public Access goals to increase involvement and benefits to people. Additionally, the CBP signed a new directive to address environmental justice and diversity issues and provide benefits to underserved communities. These goals and associated outcomes are being led by the Stewardship GIT, under leadership from the NPS. Local governments want CBP outcomes to provide additional benefits to communities including improved public access, flood mitigation and safer drinking water. There is new funding under the BIL which may be available to address these needs.
- *Selected existing tools that can be used to target resources:*
 - Environmental Justice and Equity Dashboard: shows how CBP outcomes can provide benefits to underserved communities. An example of where water-quality improvements would benefit underserved communities is shown in figure 6.
- *Potential broader opportunities to further targeting and enhance tools*
 - Environmental Justice and Equity Dashboard could be enhanced to include additional information on protecting communities from flooding and drinking water protection.
 - Identify opportunities to align the implementation of the CBP DEIJ Strategy Implementation Plan with priority areas associated with other Outcomes.
 - Underrepresented communities, including people of color and low-income communities, can serve as a geographic overlay for the expenditure of conservation and restoration targeting funds for other Outcomes (see Most Effective Basins as an example).
 - Target the Conservation of “Green Spaces” in Underrepresented and Low-Income Urban and Rural Communities (as identified in the FY21 GIT Funded project)
 - Better integrate social science considerations into geographic targeting tools.
 - Explore opportunities to align environmental literacy with other Outcomes by considering the geography of school districts alongside watershed and political boundaries.

Proposed next steps to support targeting of resources

To advance targeting several CBP partners are in the process of developing short term and long-term actions. The initial CBP partners include USGS, CBPO GIS and CAST teams, EPA ORD and Region 3, NOAA, and the Chesapeake Conservancy.

- The short-term actions which are currently supported include:
 - Identify tools that are being applied by stakeholders for management decisions (attachment 1).
 - Create a website to provide centralized “hub” to access to tools and increase their accessibility. A draft is available: <https://gis.chesapeakebay.net/targeting/>
 - Identify existing tools that should be included on the website.
 - Have agencies and grant-management organization consider applications of existing tools to target resources, with a focus on new funds from the BIL.
- Longer term: Develop a comprehensive approach for targeting resources to advance multiple CBP outcomes and provide local benefits. With additional resources, tools could be enhanced to address multiple CBP outcomes, new data sets and approach could be developed, and support could be increased for stakeholder decisions.

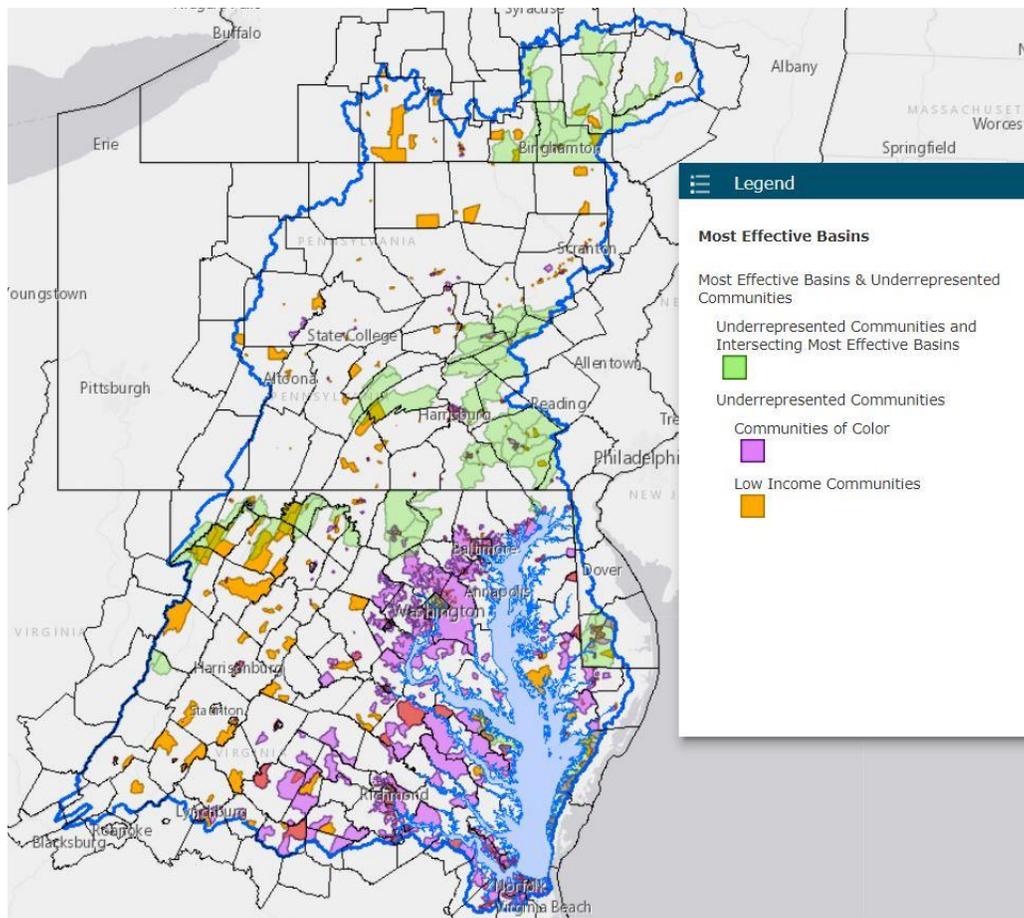


Figure 6: Places where communities of color or low income that would benefit from water-quality improvements.

- *Integrate targeting tools to address Cross-Outcome benefits.*
 - Most targeting tools are currently focused on a particular Outcome. There is an opportunity to streamline and integrate targeting approaches across the four themes (water quality, habitat restoration, land conservation, benefits to people) through the identification of specific use cases/management questions and evolve the targeting tools to address these issues.
 - Identify efforts under the CAST modeling effort can be used to improve targeting.
- *Include upcoming science and develop new information.*
 - The upcoming science includes results from ecosystem services studies, high-resolution land cover and use data, and new spatial data for habitats.
 - Identify missing data and gaps needed to further inform targeting.
 - Expand the scope of the targeting tools portal to non-geographic tools, including ecosystem services assessment, structured decision making and tools to facilitate adaptive management
- *Increase support with agencies and organizations to apply existing tools and better utilize the new information to target resources.*

- Provide training or develop training materials for the use of selected tools, potentially including technical assistance to apply these tools.
- Develop an approach for tracking the impacts of targeted implementation
- Continue to document and promote science-based targeting to CBP Partnership decision-makers.
- Develop case studies and other training materials to assist users in the application of targeting tools. Conduct training in the use of targeting tools to interested audiences.
- Dedicate staff resources to addressing evolving targeting needs, including coordination of new capabilities, user training and case study development, and tracking the use of targeting for implementing science-based decisions.

Those contributing to the effort include:

- USGS: Scott Phillips and Ken Hyer (leadership and engaging partners).
- CBP Office: John Wolf (leadership and GIS information) and Olivia Devereux (CAST and co-benefits).
- USEPA ORD: Ryann Rossi and Susan Yee (Ecosystem Services information for CAST).
- USEPA Region 3: Bill Jenkins (Integrating with EPA tools).
- NOAA: Bruce Vogt and Justin Shapiro (Estuary information).
- Chesapeake Conservancy: Joel Dunn (Conservation Atlas and Land Data)

References

- McGee, B., M. Bryer, J. Davis-Martin, L. Wainger, R. Batiuk, J. Greiner, S. Newbold, K. Saunders, S. Phillips, R. Dixon.(2017). [Quantifying Ecosystem Services and Co-Benefits of Nutrient and Sediment Pollutant Reducing BMPs. Download.](#)

The Initial draft was developed by Scott Phillips and Ken Hyer (USGS) and John Wolf (USGS and CBPO GIS team lead) February 2022. Presented to and revised based on feedback from:

- Chesapeake Bay Commission staff (Feb 2022)
- STAR (Feb 2022)
- Federal Office Directors (March 2022)
- CBP Goal Team Chairs (March 2022)

Attachment 1. Initial listing of important tools for geographic targeting.

Access to these and other tools is available at <https://gis.chesapeakebay.net/targeting/>

Tools	Primary Use	Point of Contact and URL
Accelerate Water Quality Improvements		
Nontidal Network	Understand water quality loads and trends throughout the watershed	
Priority Agricultural Watersheds	Investigate the potential influence of agriculture on the Bay and local waters	K Shenk (EPA), J Wolf (USGS)
Watershed Dashboard	Provide access and visualization of data and technical information that can help guide water quality and watershed planning efforts	R Cassilly (UMD), JWolf (USGS)

CAST	Run scenarios to investigate water quality impacts of changes in land use or management practices	O. Devereux
Most Effective Basins	Investigate most effective basins for nutrient reductions based on two factors: cost effectiveness and load effectiveness	L. McDonnel (?), J Wolf (USGS)
Toxic Contaminants	Identify waters with toxic contaminant impairments and associated TMDLs	G. Allen (EPA)
Coordinate Habitat Restoration		
Forest Buffer/riparian restoration	Identify opportunities for riparian forest buffer restoration	E Bryson (EPA), J Wolf (USGS)
Fish Passage Prioritization	Identify priorities for fish passage projects	TNC
Wetlands	Identify opportunities for wetland restoration	E Bryson (EPA), J Wolf (USGS)
Sea-level rise	Identify areas vulnerable to sea level rise	NOAA
National Fish Habitat Assessment	Identify vulnerable to fish habitat degradation	
Chesapeake Healthy Watersheds	Identify watersheds with important ecological values and watersheds vulnerable to change	R. Thompson
Streams	Determine stream health based on Chessie-BIBI	P Tango (USGS), M. Mallonee (ICPRB)
Brook Trout	Identify brook trout habitat occupancy and vulnerability to change	S Faulkner (USGS)
Enhance land conservation		
Conservation Atlas	Identify areas important to conserve based on forests, farmland, habitat, heritage, and public health criteria	J Leizear (CC)
Land-Change Model	Identify area vulnerable to conversion from population growth and development	P Claggett (USGS)
Increase benefits to people		
Diversity Dashboard	Identify underrepresented populations of people	J Wolf (USGS), B Williams (EPA)