Building Upon Gunpowder Valley Conservancy Tree Planting Successes

A Direct-Outreach to Land Owners Experiment

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For the
Gunpowder Valley Conservancy

With Funding Provided by the
Chesapeake Bay Trust

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Contents

SUMMARY

Thanks to a grant from the Chesapeake Bay Trust, the Gunpowder Valley Conservancy conducted a test using direct outreach to increase forest cover by offering free tree-planting assistance to 100 rural landowners.

To first learn what works with regard to maximizing the number of landowners responding to direct-mail outreach, the test began with a survey of 31 organizations involved in tree planting throughout the Chesapeake Bay watershed. This survey revealed that the more direct-mail resembles a personalized letter (vs. junk mail) the higher the response rate. An example of the Conservancy letter incorporating personalization and other features to maximize response will be found on pages 4 and 5 of this report. The survey also indicated that the initial test should focus on those who resided on their land. Since the survey indicated financial incentives were key to planting trees on working farms and the Conservancy could not offer this incentive, working farms were not included in this test but could be in a future phase linked to programs such as Maryland's Conservation Buffer Initiative.

Next, the Conservancy researched where tree-planting would have the maximum water quality benefits. This research resulted in the following criteria for selecting 100 parcels for the test mailing:

- The parcel encompassed areas where trees could be planted that were at least:
  - A half-acre of riparian (within 100-feet of a waterway) area, or
  - One acre of upland area.
- The parcel was residential (owned by private parties who resided on the parcel, not a corporation, institution, etc.),
- The parcel was not part of a working farm, and
- In addition to a riparian area, the parcel might include floodplain or steep-slope (≥15%) areas where trees could be planted.

The Maryland Environmental Resources and Land Information Network (MERLIN) online mapping resource was used to identify 100 candidate parcels meeting the criteria above with the following data layers turned on:

- NAIP Imagery 2018,
- Parcel Boundaries,
- Maryland Forests - Forested Buffers, and
- Plantable Area Analysis.

In March and April 2024, letters were mailed to 100 owners of parcels. Of the 100 landowners, 14 responded to the letter and requested further information about how the Conservancy could assist in planting trees on their property. The 14% response rate is far above the 1% typical of direct-mail and is within the 10% to 20% response rate reported by other Chesapeake Bay watershed tree-planting organizations that have used this approach.

INTRODUCTION

The Gunpowder Valley Conservancy received a grant from the Chesapeake Bay Trust to test the effectiveness of targeted direct-mail for increasing the number of watershed landowners participating in the Conservancy's free tree-planting assistance program. Targeting took the form of focusing on parcels where tree-planting would provide the greatest water quality benefits and where parcels are owned by those most likely to respond to the Conservancy's offer.

The water quality benefits of the Conservancy's tree-planting program are presented in the section of this report headed Forests & Gunpowder Aquatic Resource Health. An explanation of why tree-planting is necessary even in areas where forest regeneration should be occurring naturally can be found in Tree-Planting & Maintenance Accelerates Riparian-Floodplain Reforestation.

The first step in this test was research into what other tree-planting agencies and organizations had learned from their direct-outreach efforts. The review consisted of identifying agencies and organizations engaged in tree-planting in the Chesapeake watershed. An email was sent to 31 of these groups. In the message a request was made for details regarding what direct outreach approaches each group found to be most effective. Half of the 31 groups responded to the request.

Google Scholar was used to search for scientific research regarding the factors prompting landowners to implement stream buffer planting and other conservation practices. The detailed results of this research is provided in the section of this report headed What Works: Tree-Planting & Direct Landowner Outreach.

Following is a summary of the factors this research indicated would increase the response rate to direct-mail letters to prospective tree-planting landowners:

The letter should:

- Come from a conservation organization with a locally-recognizable, respected name and a local address,
- Not look like a typical direct (junk) mail by:
    - Addressing it to the landowner(s) and not as "resident" or some other generic term like "neighbor",
    - Affix a first-class stamp' not send it via bulk mail, and
    - Personalize the letter by including references unique to the landowner such as:
        - Dear Ms. Smith vs. Dear Neighbor,
        - The name of the stream their property abuts, and
        - A map showing possible tree-planting locations on their property.

The research along with the extensive use of these direct-mail steps in my other work has shown that they increase the response rate from the 1% typical of direct-mail to a range of 5% to 30%.

The second step was the development of criteria for selecting parcels where tree-planting would have the greatest benefits to Gunpowder watershed aquatic resource health and where a parcel was owned by those most likely to respond to the Conservancy's offer. This process resulted in the following candidate parcel selection criteria:

- The parcel encompassed areas where trees could be planted that were at least:
    - A half-acre of riparian (within 100-feet of a waterway) area, or
    - One acre of upland area.
- The parcel was residential (owned by private parties who resided on the parcel, not a corporation, institution, etc.),
- The parcel was not part of a working farm, and
- In addition to a riparian area, the parcel might also include floodplain or steep-slope (≥15%) areas where trees could be planted.

The justification for these selection criteria is provided in the section of this report headed Candidate Tree Planting Priority Parcels.

The Maryland Environmental Resources and Land Information Network (MERLIN) online mapping resource was used to identify candidate parcels meeting the criteria above. The following data layers turned on:

- NAIP Imagery 2018,
- Parcel Boundaries,
- Maryland Forests - Forested Buffers, and
- Plantable Area Analysis.

A two-step process was used to verify that each candidate parcel still met the criteria. Each parcel was viewed with 2023-2024 Google Earth aerials. Most of the parcels were also viewed from nearby roads or other areas open to the public. The mailing address was verified using a database that tends to be a bit more up to date than property records. Only one of 100 letters was returned due to "Return to Sender Vacant Unable to Forward."

A letter was then sent via first-class U.S. mail to the owner(s) of one hundred parcels meeting the above criteria. An example of the letter can be viewed on the next two pages of this report. The second page of each letter was further personalized by including a MERLIN screenshot showing areas that were likely to meet Conservancy tree-planting criteria.

GUNPOWDER VALLEY CONSERVANCY

«OWNER1»
«OWNER2»
«ADDRESS»
«CITY_STATE_ZIP»

April 30, 2024

Dear «SALUTATION»:

May we plant trees on your property at no cost to you? Our nonprofit organization has funding to expand forested habitat along Gunpowder watershed tributaries.

My name is Kim Thomas, and I am the Associate Reforestation Program Manager at Gunpowder Valley Conservancy (GVC). We are a local nonprofit that works to protect and restore the lands and waterways of the Gunpowder watershed. GVC has grant funding to expand our reforestation efforts and is interested in identifying potential planting sites near tributaries, such as along your stream «STREAM». If you are the current owner of the property shown in the map on the next page, this opportunity would be, again, at no cost to you!"

Since 1989, GVC has planted over 36,000 trees to preserve and enhance water quality of the 850 miles of tributary streams that flow throughout the Gunpowder watershed. Other benefits of planting trees include enhanced wildlife diversity, increased property value, and climate change mitigation.

If you are interested in this no-cost opportunity, please contact me through one of the following methods:

- Contact me at (443) 797-9341 or kthomas@gunpowdervc.org
- Complete our online form by using the QR code or visit: **gunpowdervalleyconservancy.org/program/tree-planting**
- Or, complete then return the enclosed postage-paid post card

I would schedule a time this summer to visit your property with you at your convenience. If it is a good fit for tree planting, we would work together to identify native tree species suited to your site and where to plant them next spring. GVC would provide volunteers to participate in the planting event and would also provide ongoing tree maintenance for a few years following the planting.

Please let me know if you have any questions, and I look forward to hearing from you!

Thank you for your time,

Kim Thomas, GVC Associate Reforestation Program Manager

GUNPOWDER VALLEY CONSERVANCY

While it is your choice where they are planted, public records indicate the pink or red highlighted areas below have tree planting potential. Planting trees near streams, in floodplain areas and on steep slopes would be the most beneficial for the health of the Gunpowder watershed.

GVC has planted over 36,000 native trees thanks to the help of enthusiastic volunteers of all ages. We hope you will fill out our brief form to find out more about our tree planting opportunities. Thank you!

Gunpowder Valley Conservancy | PO Box 9733 | Towson, MD 21284

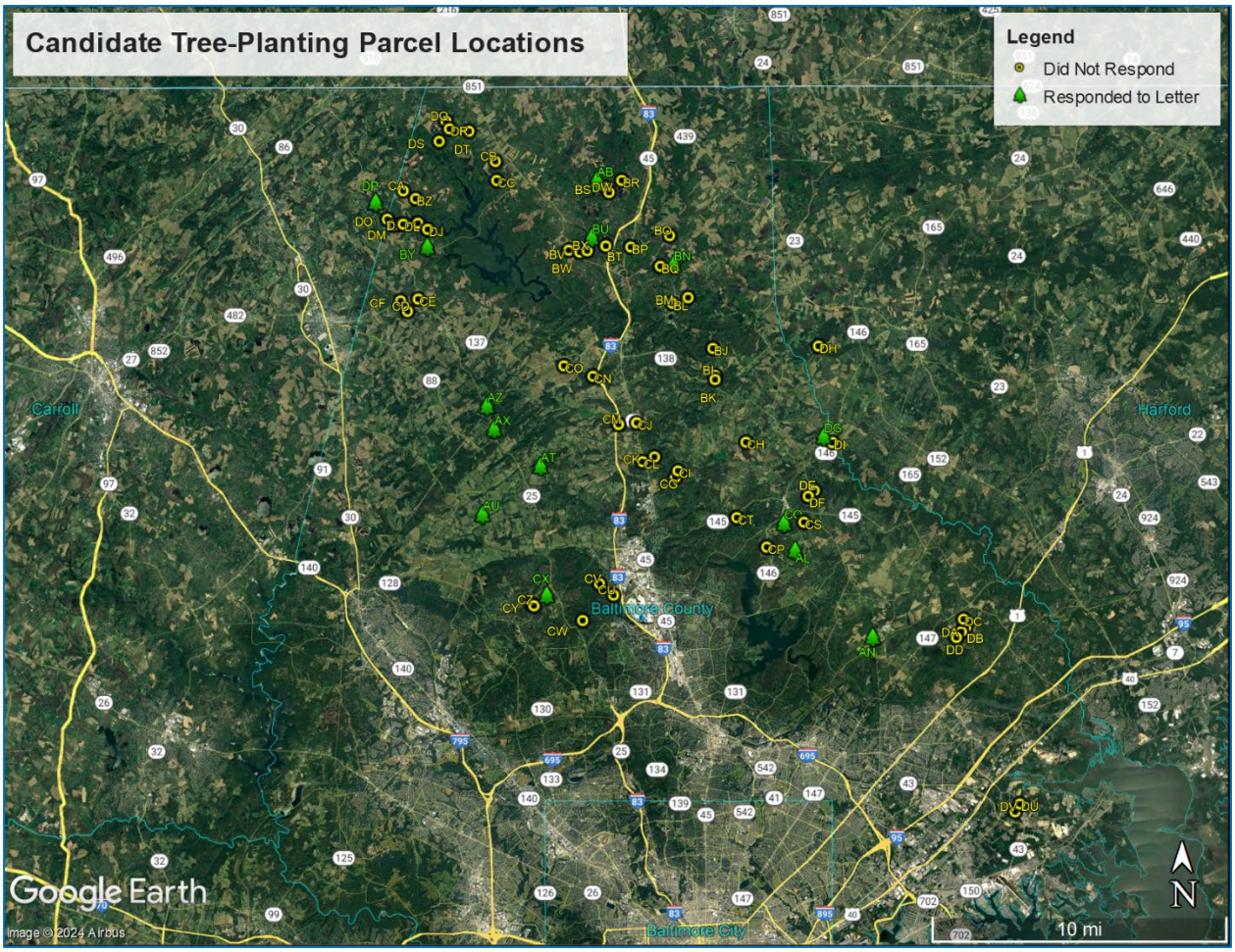
To educate and mobilize people and resources to preserve and restore the lands and waterways of the Gunpowder Watershed.

RESULTS OF PARCEL OWNER DIRECT-MAIL OUTREACH

The two-page letter was sent with first-class postage to the owners who resided on the 100 parcels that met the selection criteria presented in the previous section of this report. At the end of this report is a spreadsheet showing the 100 parcels and the selection criteria each parcel met along with other characteristics. The name and address of parcel owners is not included in the spreadsheet.

The letter reflects lessons learned from a number of other organizations which have employed direct-outreach to encourage landowners to plant trees on their property. These lessons were gleaned from the survey of 31 agencies and organizations described in the section of this report headed What Works: Tree-Planting Agencies & Organizations. The letter was signed by Kim Thomas, who serves as the Conservancy Associate Reforestation Program Manager.

The aerial below shows the general location of the 100 parcels. The green trees in the aerial are the location of the parcels where the 14 landowners responded to the letter by requesting further information about the Conservancy's tree-planting assistance.



The two-letters (e.g., AB) accompanying each marker in the aerial above corresponds to the 100 parcels listed in the spreadsheet at the end of this report. Clicking on the blue two-letter marker in the spreadsheet will take you to a MERLIN map of each parcel.

Four options were provided in the letter for requesting Conservancy assistance:

- Landowners could call Kim Thomas at the phone number included in the letter,
- They could send a request for assistance via the email address included in the letter,
- Landowners could scan the QR Code included in each letter with their cell phone camera which linked to the Tree Planting Interest Form on the Conservancy's website, or
- Landowners could return a postage-paid response card enclosed with each letter.

The typical direct-mail response rate is about 1%. Of the 100 landowners who received a letter from the Conservancy, 14% requested further information. Only one of the 100 letters was returned due to an undeliverable address.

Half of the 14 interested landowners called Ms. Thomas. Four (29%) of the landowners sent an email. Two (14%) used the postage-paid response card to request Conservancy tree-planting assistance. One (7%) completed the online request form posted on the Conservancy website. The table on the next page provides details for the 14 parcels where the owners requested Conservancy tree-planting assistance.

Characteristics of Parcels Owned by Those Who Responded to the Gunpowder Watershed Candidate Tree-Planting Letter

		PERCENT OF ACRES PLANTABLE		PLANTABLE ACRES		PLANTABLE PRIORITY OR EXCLUSION AREAS 1=Yes 0=No				OWNERSHIP		RESPONDED TO LETTER AS INTERESTED IN TREE-PLANTING									PLANTABLE AREAS VERIFICATION		
MERLIN MAP	PARCEL ACRES	Riparian[1]	Upland[2]	Riparian[1]	Upland[2]	Riparian	Floodplain	Steep Slope	Percent Wetland - Plantable Area	Private Individuals	Primary Residence	By Phone	Via GVC Website	By Response Card	By Email	Other	STREAM	12-DIGIT WATERSHED	12-DIGIT WATERSHED NAME	COUNTY	Within View of Public Roads	Plantable Acres Verified From Nearby Roads	Plantable Acres Verified From 2023-24 Aerial Images
AB	5.10	30%	10%	1.53	0.51	1	1	0	0%	Yes	Yes	1					along Little Falls	021308050312	Upper Little Falls	Baltimore	Yes	Yes	Yes
AL	22.66	10%	60%	2.27	13.60	1	1	0	0%	Yes	Yes	1					along Fitzhugh Run	021308050300	Lower Loch Raven Reservoir	Baltimore	No	Not Applicable	Yes
AN	35.62	5%	45%	1.78	16.03	1	1	0	2%	Yes	Yes	1					along Cowen Run	021308020297	Big Gunpowder Falls Below Loch Raven	Baltimore	No	Not Applicable	Yes
AT	111.76	2%	3%	2.24	3.35	1	1	0	0%	Yes	Yes	1					along Western Run	021308050303	Western Run	Baltimore	Yes	Yes	Yes
AU	8.75	10%	35%	0.88	3.06	1	1	0	2%	Yes	Yes				1		along Western Run	021308050303	Western Run	Baltimore	Yes	Yes	Yes
AX	3.87	35%	35%	1.35	1.35	1	1	1	0%	Yes	Yes	1					along Blackrock Run	021308050307	Blackrock Run	Baltimore	Yes	Yes	Yes
AZ	6.54	10%	25%	0.65	1.64	1	1	1	0%	Yes	Yes	1		0			along Blackrock Run	021308050307	Blackrock Run	Baltimore	Yes	Not Applicable	Yes
BN	22.05	1%	9%	0.22	1.98	1	1	1	0%	Yes	Yes		1				along Second Mine Branch	021308050309	Little Falls & Mine Branches	Baltimore	No	Not Applicable	Yes
BU	10.27	5%	25%	0.51	2.57	1	1	1	0%	Yes	Yes				1		along Owl Branch	021308050310	Little Falls - Owl Branch	Baltimore	No	Not Applicable	Yes
BY	20.68	10%	10%	2.07	2.07	1	1	1	0%	Yes	Yes	1					along Compass Run	021308060313	Prettyboy Reservoir	Baltimore	No	Not Applicable	Yes
CQ	23.89	5%	25%	1.19	5.97	1	1	1	0%	Yes	Yes				1		along Overshot Run	021308050301	Upper Loch Raven Reservoir	Baltimore	No	Not Applicable	Yes
CX	36.42	5%	5%	1.82	1.82	1	1	0	0%	Yes	Yes			1			along Beaverdam Run	021308050302	Beaverdam Run	Baltimore	m	Not Applicable	Yes
DG	68.78	5%	5%	3.44	3.44	1	1	1	0%	Yes	Yes			1			along Parker Branch	021308040299	Upper Little Gunpowder Falls	Baltimore	No	Not Applicable	Yes
DP	14.07	5%	25%	0.70	3.52	1	1	1	0%	Yes	Yes				1		along Indian Run	021308060315	Grave Run	Carroll	Yes	Yes	Yes
AVERAGES	**27.89**	**10%**	**23%**	**1.48**	**4.35**	**1.00**	**1.00**	**0.57**				**7**	**1**	**2**	**4**	**0**							

CANDIDATE TREE-PLANTING PARCEL SELECTION

The Gunpowder Valley Conservancy considered a number of criteria for identifying the 100 watershed land owners to receive a letter offering free tree-planting assistance. The overall criteria were:

- Locations where tree-planting would have the greatest water quality benefits, and
- Parcels where the owners were most likely to plant trees on their land.

Letters were mailed to the owner(s) of 100 parcels that met the following selection criteria:

A. There were at least 0.5-acres of riparian and/or at least 1.0-acres of upland tree-planting area based on the Plantable Areas layer created by the Chesapeake Conservancy Conservation Innovation Center, ***and***

B. These Plantable Areas are located:
   i. In riparian areas (those within 100-feet of a stream bank top or shoreline), ***or***
   ii. On floodplain areas, ***or***
   iii. On steep slopes (those rising-falling 15-feet or more vertically for every 100 feet of horizontal distance), ***and***

C. Wetlands are ***absent*** based on the Plantable Areas layer, unless the wetland occupied a small portion of the parcel in which case the owner would be discouraged from altering wetland functions by planting trees in the wetland.

D. The parcel was in the rural portion of the Gunpowder watershed. The table on the next page shows the 27, 12-digit subwatersheds making up the 478-square mile Maryland portion of the Gunpowder watershed. A map of these 27 subwatersheds will be found on the page following the table. Since the Conservancy wished to focus on rural portions of the Gunpowder watershed, two of the 27 subwatersheds were excluded because they were mostly suburban. Also, the Tidal Gunpowder River East subwatershed was excluded because it is mostly located within Aberdeen Proving Grounds where tree-planting could be problematic. The South Branch Gunpowder Falls was set aside for a possible joint, future project with the Maryland Chapter of Trout Unlimited. The number of landowners contacted in each subwatershed is provided in the table on the next page.

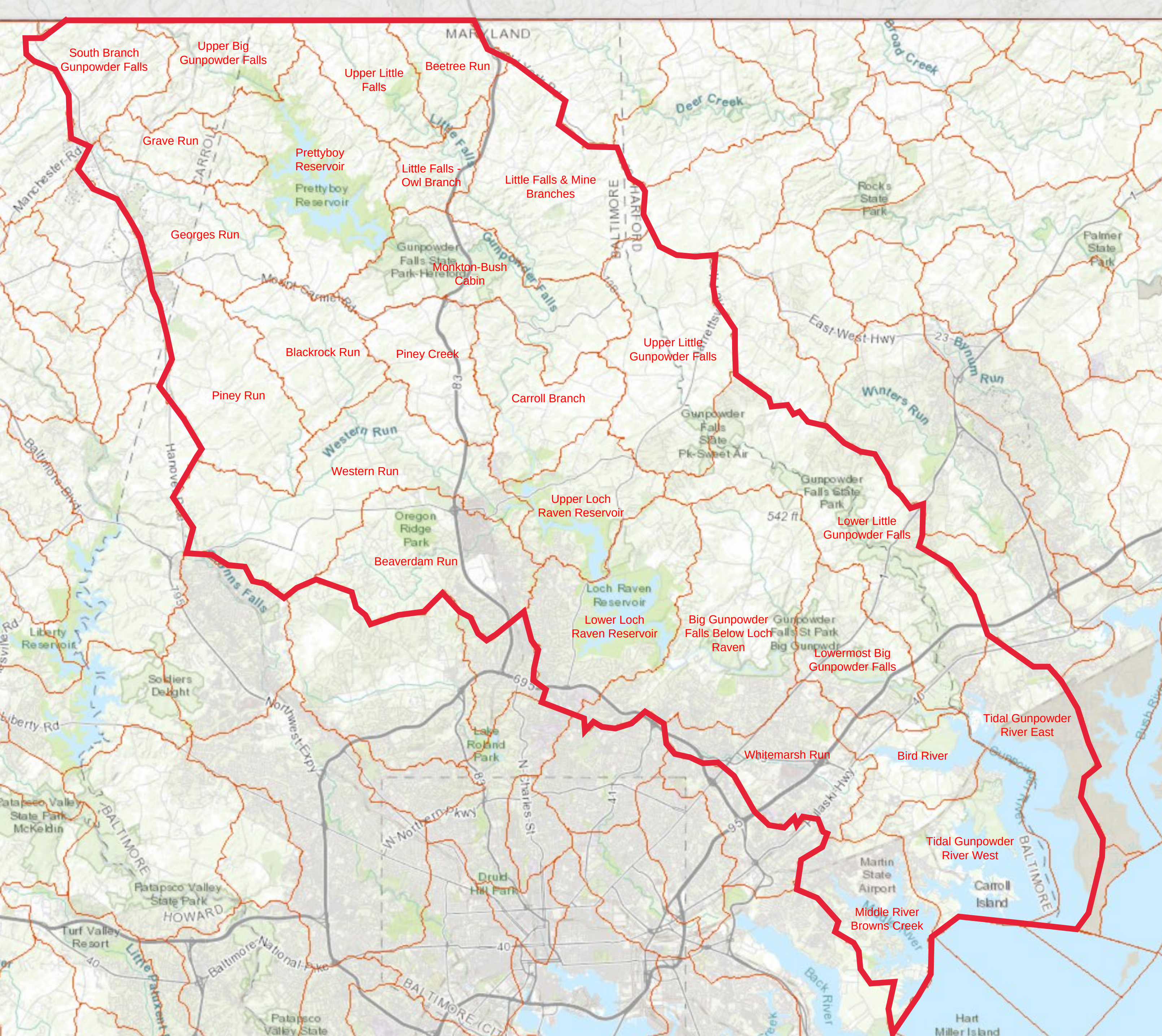
E. Parcels owned by private parties who reside on the parcel were prioritized. It was thought that owners residing on a parcel were more likely to respond to the Conservancy's offer to plant trees on their land. Owners who lived elsewhere could be a bit less inclined to plant trees. It was also thought that corporate or institutional owners might be less inclined to respond to a letter when compared to parcels where the owner resided on the parcel.

Further detail can be found in the section of this report headed Candidate Tree Planting Priority Parcels.

Gunpowder River 12-Digit Subwatersheds

12-Digit Watershed ID	CEDS 12 Digit Watershed Name	SUBWATERSHED AREA		CEDS ESTIMATE		Number of Landowners Receiving Letter
		Acres	Square Miles	Percent Rural	Percent Suburban	
21308010292	Tidal Gunpowder River West	12,199.27	19.06	50%	50%	0
21308010293	Tidal Gunpowder River East	12,784.81	19.98	Mostly APG & Suburban		Excluded
21308020296	Lowermost Big Gunpowder Falls	8,848.22	13.83	50%	50%	4
21308020297	Big Gunpowder Falls Below Loch Raven	20,391.03	31.86	70%	30%	5
21308030294	Bird River	7,490.02	11.70	50%	50%	2
21308030295	Whitemarsh Run	10,246.47	16.01	10%	90%	Excluded
21308040298	Lower Little Gunpowder Falls	22,350.56	34.92	90%	10%	5
21308040299	Upper Little Gunpowder Falls	14,988.89	23.42	100%	0%	5
21308050300	Lower Loch Raven Reservoir	14,584.85	22.79	40%	60%	3
21308050301	Upper Loch Raven Reservoir	8,743.52	13.66	70%	30%	5
21308050302	Beaverdam Run	13,498.75	21.09	70%	30%	6
21308050303	Western Run	20,108.04	31.42	95%	5%	5
21308050304	Carroll Branch	9,549.26	14.92	100%	0%	4
21308050305	Piney Creek	7,864.04	12.29	100%	0%	5
21308050306	Monkton-Bush Cabin	13,545.17	21.16	100%	0%	4
21308050307	Blackrock Run	8,700.67	13.59	100%	0%	5
21308050308	Piney Run	12,490.44	19.52	100%	0%	5
21308050309	Little Falls & Mine Branches	16,052.33	25.08	100%	0%	6
21308050310	Little Falls - Owl Branch	3,973.02	6.21	100%	0%	6
21308050311	Beetree Run	5,142.50	8.04	100%	0%	2
21308050312	Upper Little Falls	6,681.78	10.44	100%	0%	5
21308060313	Prettyboy Reservoir	17,007.92	26.57	100%	0%	6
21308060314	Georges Run	10,093.43	15.77	100%	0%	3
21308060315	Grave Run	4,892.21	7.64	100%	0%	7
21308060316	Upper Big Gunpowder Falls	7,515.28	11.74	100%	0%	3
21308060317	South Branch Gunpowder Falls	6,946.45	10.85	100%	0%	Excluded
21308070291	Middle River - Browns Creek	9,447.40	14.76	10%	90%	Excluded
	TOTAL	**306,136.33**	**478.34**		**TOTAL**	**101**

Source: https://maryland.maps.arcgis.com/home/webmap/viewer.html?webmap=e57f1fbe43054b3ea0bee4382857dab9&extent=-79.9643,37.2887,-75.037,40.1804



MARYLAND
South Branch Gunpowder Falls
Upper Big Gunpowder Falls
Upper Little Falls
Beetree Run
Grave Run
Prettyboy Reservoir
Little Falls - Owl Branch
Little Falls & Mine Branches
Georges Run
Monkton-Bush Cabin
Blackrock Run
Piney Creek
Upper Little Gunpowder Falls
Piney Run
Carroll Branch
Western Run
Upper Loch Raven Reservoir
Lower Little Gunpowder Falls
Beaverdam Run
Lower Loch Raven Reservoir
Big Gunpowder Falls Below Loch Raven
Lowermost Big Gunpowder Falls
Tidal Gunpowder River East
Whitemarsh Run
Bird River
Tidal Gunpowder River West
Middle River Browns Creek
Broad Creek
Deer Creek
Rocks State Park
Palmer State Park
Winters Run
Bynum Run
East-West Hwy
Manchester Rd
CARROLL
BALTIMORE
HARFORD
Prettyboy Reservoir
Gunpowder Falls State Park-Hereford
Gunpowder Falls
Little Falls
Mount Carmel Rd
Western Run
Oregon Ridge Park
Loch Raven Reservoir
Gunpowder Falls State Pk-Sweet Air
Gunpowder Falls State Park
542 ft
Gunpowder Falls St Park
Liberty Reservoir
Soldiers Delight
Northwest Expy
Lake Roland Park
N Charles St
W Northern Pkwy
Pulaski Hwy
Martin State Airport
Carroll Island
Druid Hill Park
Patapsco Valley State Park McKeldin
Patapsco Valley State Park
HOWARD
Turf Valley Resort
Baltimore National Pike
Little Patuxent
Back River
Hart Miller Island
Liberty Rd
Baltimore Blvd
Hanover Pike

FORESTS & GUNPOWDER AQUATIC RESOURCE HEALTH

Though it likely goes without saying that forest is good for water quality. A brief review of the relevant science certainly supports this generalization.

The following text appeared on page 71, of the 2022 *Technical Study on Changes in Forest Cover and Tree Canopy in Maryland*:

> "Forests often have positive impacts on water quality, and several studies have found benefits from afforestation [e.g., tree planting]. Riparian forest buffers, forests along the banks of streams, are especially adept at improving water quality, including in the Chesapeake Bay watershed. In areas of the watershed with thin soils, such as the inner coastal plain, riparian forest buffer systems can retain 50 to 90% of "sediment in surface runoff and total [nitrogen] in both surface runoff and groundwater" (Lowrance et al. 1997). These forest buffers have a smaller impact on phosphorus. However, their ability to filter sediment and nitrogen, two of Maryland's leading water pollutants, is notable. Another study in the Piedmont region of southern Pennsylvania found similar results, with a smaller but significant reduction in nitrogen and sediments, but no impact on phosphorus (Newbold et al. 2010). Even when used in urban areas, afforestation can benefit the entire watershed. According to watershed simulation modeling, increasing urban forest cover can reduce sediment and nutrient loading, similar to creating riparian buffers. In addition to water quality improvements, afforestation can also decrease stormwater runoff, increase groundwater recharge and make the watershed more resilient to adverse conditions (Matteo et al. 2006). However, according to a 2014 review paper, the optimum width for riparian buffers to improve water quality, habitat and biota in small streams is 30 meters [98 feet] or more, roughly double the 50-foot buffer recommended in the FCA [Forest Conservation Act] (Sweeney and Newbold 2014)."

In a 2003 paper, *IKONOS imagery for resource management: Tree cover, impervious surfaces, and riparian buffer analyses in the mid-Atlantic region*, researchers reported on a comparison of percent forest cover and percent of stream channel with minimum100-foot riparian forest buffe with stream health ratings in Montgomery County, MD. Table 8, above summarizes the findings of the University of Maryland and Woods Hole researchers who conducted this study. To preserve a stream health in an excellent condition, which makes the stream suited to all human uses as well as sensitive aquatic communities excellent, Table 8 indicates half the watershed must in forest and a forest buffer must extend 100-feet from both banks along at least 77% of the channel. As these percentages decline, so does stream quality, human uses, and sensitive aquatic communities.

Table 8
Small watershed sample size and average statistics by stream health rating category

Stream health rating	*n*	Area (km^2)	Impervious (%)	Tree cover (%)	Buffered (%)
Excellent	38	272	3.6	50.6	76.8
Good	81	658	4.9	44.6	71.3
Fair	76	451	13.9	37.0	63.2
Poor	50	356	19.5	29.6	56.3

Brook trout *(Salvelinus fontinalis)* may be ***the*** most sensitive fish species native to Maryland. Brook trout are heavily dependent on watershed and riparian forest cover as well as being the least tolerant of watershed impervious cover (buildings, streets, etc.). The following graph, from the 2020 Maryland Department of Natural Resources publication *Land Use Characteristics of Trout Watersheds in Maryland*, shows how brook trout and the introduced brown trout decline as percent watershed forest cover diminishes. By the way, "Brook trout stronghold watersheds represent those with the most robust populations and highest densities in the state."

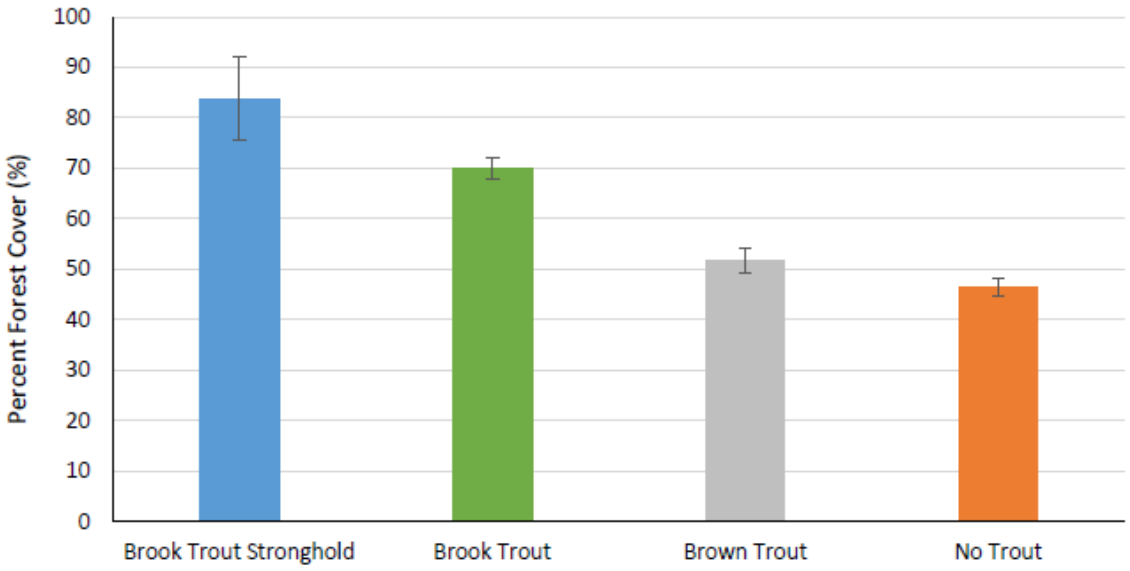
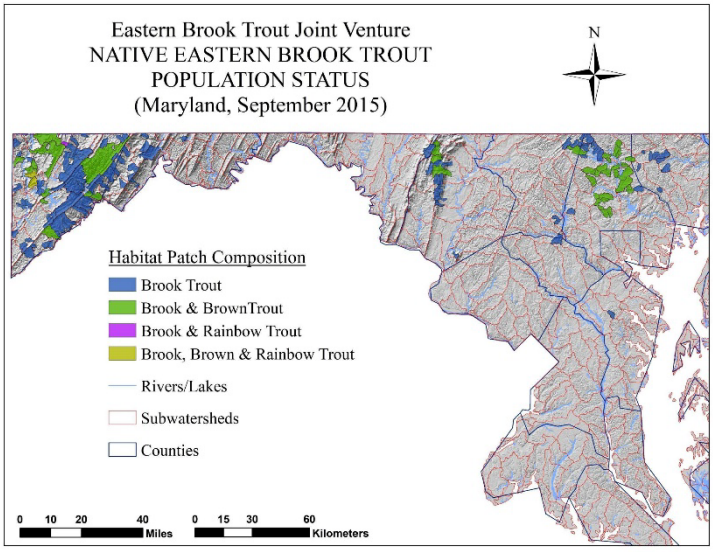


Figure 2. Average percent forested land cover in 14-digit watersheds that support brook and brown trout populations. Brook trout stronghold watersheds are those that support the highest most robust densities in the state.

The Eastern Brook Trout Joint Venture map below shows that the Gunpowder watershed has the second highest concentration of brook trout streams in Maryland outside Garrett County.



TREE-PLANTING & MAINTENANCE ACCELERATES RIPARIAN-FLOODPLAIN REFORESTATION

I have been hiking and biking Gunpowder watershed trails for five decades. There are many areas that have always lacked trees for no reason obvious to this amateur naturalist. The locations which come to mind are mostly riparian and floodplain areas.

After becoming involved in the Gunpowder Valley Conservancy's efforts to increase forest cover, I sought to verify this impression by viewing these sparsely treed areas using Google Earth historical aerial images. Most of the areas had pretty much the same paucity of trees in 1995 as they do in the most recent 2023 images.

In hopes of learning why these areas lack denser tree growth, I posed the following question to Stroud Water Research Center Watershed Restoration Coordinator Lamonte Garber:

> "I've noticed a number of floodplains with scattered trees and many areas in between where trees could have grown, but haven't. Following are photos of two examples. Is there a particular reason why more trees have not grown within these areas?"

Mr. Garber responded: "Each case would have its own explanation but here are the likely, possible variables reducing current tree coverage and future regeneration:

- Intense competition from invasive grasses especially Reed Canary Grass and Japanese Stilt Grass,
- Competition from invasive vines like Japanese Hops, Oriental Bittersweet, and Mile-A-Minute, which engulf any seedlings that manage to emerge,
- Herbivory from meadow voles (which attack seedlings from below) and deer (browsing from above),
- Ash tree die off; many landowners have been clearing out dead ash from their floodplains, leaving big gaps of empty space. The shady conditions that remain are a challenge for new seedlings. Not apparent in these pics but possible but certainly a factor elsewhere."
- If a floodplain is very poorly drained and wet, there are many fewer tree species that thrive in those conditions. The following species are strong candidates for planting in these poorly

drained-wet floodplain soils: black willow, sycamore, box elder and silver maple. So, it's a challenging environment for forest regeneration, but definitely feasible and worth the effort!

Mr. Garber and others at the Stroud Center have been studying these and other reasons for poor survival when trees are planted on floodplains and elsewhere. More importantly, Stroud Center scientists have developed a number of methods for enhancing tree survival. In the 42-minute video *Some Insights on Reforestation Methods* another Stroud Watershed Restoration Manager, David Wise, explains how tree survival increases dramatically with proper tree care during the establishment phase. The Stroud Center has conducted numerous research trials on such techniques.

Is it possible that by applying these methods through the Conservancy's tree-planting and maintenance program that areas which have seen little new tree growth for 50 years could become lush, productive forests? This certainly seems a possible outcome and may be the best option for accelerating the stream- and climate-saving benefits of Gunpowder watershed reforestation.

WHAT WORKS: TREE-PLANTING & DIRECT LANDOWNER OUTREACH

An online search was conducted to identify government agencies, non-profits and other organizations involved in encouraging tree-planting on private property. The search resulted in the following 31 agencies and organizations: American Rivers, Alliance for the Chesapeake Bay, Anne Arundel Watershed Stewards Academy, Arbor Day Foundation, Atlantic Coastal Fish Habitat Partnership, Baltimore County Turf to Trees Program, Blue Water Baltimore, Canaan Valley Institute, Chesapeake Bay Foundation, Chesapeake Tree Canopy Network, Eastern Brook Trout Joint Venture, Eastern Waters Council Conservation, Foundation for Food and Agriculture Research, Frederick County Creek ReLeaf, Gunpowder RiverKeeper, Howard County Stream Releaf, Izaak Walton League of America, Maryland Forest Service, Mid Atlantic Chapter of the International Society of Arboriculture, OpinionWorks, Pennsylvania Riparian Forest Buffers Program, Reforest Montgomery, Southeast Aquatic Resources Partnership, The Nature Conservancy, Tree ReLEAF Grant Program, TREES Virginia, Trust for Public Land, USDA Forest Service, Washington County Soil Conservation District, Waterkeepers Chesapeake, and the Western Pennsylvania Conservancy.

An email was then sent to each inquiring about their use of mailing or other methods to contact landowners directly about their interest in planting trees on their property. Responses were received from about half of those contacted. Following is a summary of the direct-outreach approaches employed by these groups, the results, and their recommendations for improving landowner response.

Anne Arundel Watershed Stewards Academy Tree Troopers Program

The Tree Troopers Program is managed by Restoration Coordinator Faith Waaramaa (faith@aawsa.org; 301-531-4088). The Watershed Stewards Academy also oversees RePlant Anne Arundel. The following webpage text summarizes successes thus far:

> "Since 2020, RePlant Anne Arundel has planted over 19,000 trees and engaged over 2,000 residents! Over 6,000 of these trees were planted through Tree Trooper projects."

Direct-mail is a small part of the outreach the Academy makes to land owners encouraging the planting of trees on their property. In a September 18th email message, Ms. Waaramaa wrote "For outreach, it is most often that our trained volunteers connect with community members to help them plan projects on private property in residential areas. We also have volunteers who partner with libraries, schools, private non-profits, congregations, community centers, etc. to plant trees. In efforts to expand our reach, we often table at community events with outreach materials about our tree programs and post on social media about upcoming opportunities to receive trees. Earlier this year – 2024 - we also hosted our second cohort of Tree Ambassadors, a program that launched in 2022 in efforts to expand our reach to historically under-engaged communities in priority planting regions as identified by CBF's Urban Tree Grant Eligibility Map. This is a very similar program to our Tree Trooper training, but this program offers stipends to its participants and we also provide additional support to Spanish- speaking participants through live translators and translated training materials.

I'd also just say that expanding our outreach to congregations has become a significant goal as there tends to be a lot of room for trees, and oftentimes they have stormwater issues they would

like support in addressing. We aim to reduce the barriers to planting by providing trees at low costs, sometimes waiving the payment if it is a barrier to the community, and providing property owners a maintenance plan template for the first 3 years after the planting. We also have tree distribution programs such as Groves of Gratitude and Backyard Buffers that support property owners in selecting a bundle of species that will do well for their space/planting goals. For example, we had a "Wet Canopy" bundle this past spring that I know many folks planted in riparian areas."

Tree Trooper volunteers attend virtual training sessions covering topics like Benefits of Trees, Tree Biology, Right Tree Right Place + Tree Trooper Community Outreach Strategies, Tree Planting, Tree Maintenance, and Tree Trooper Project Logistics.

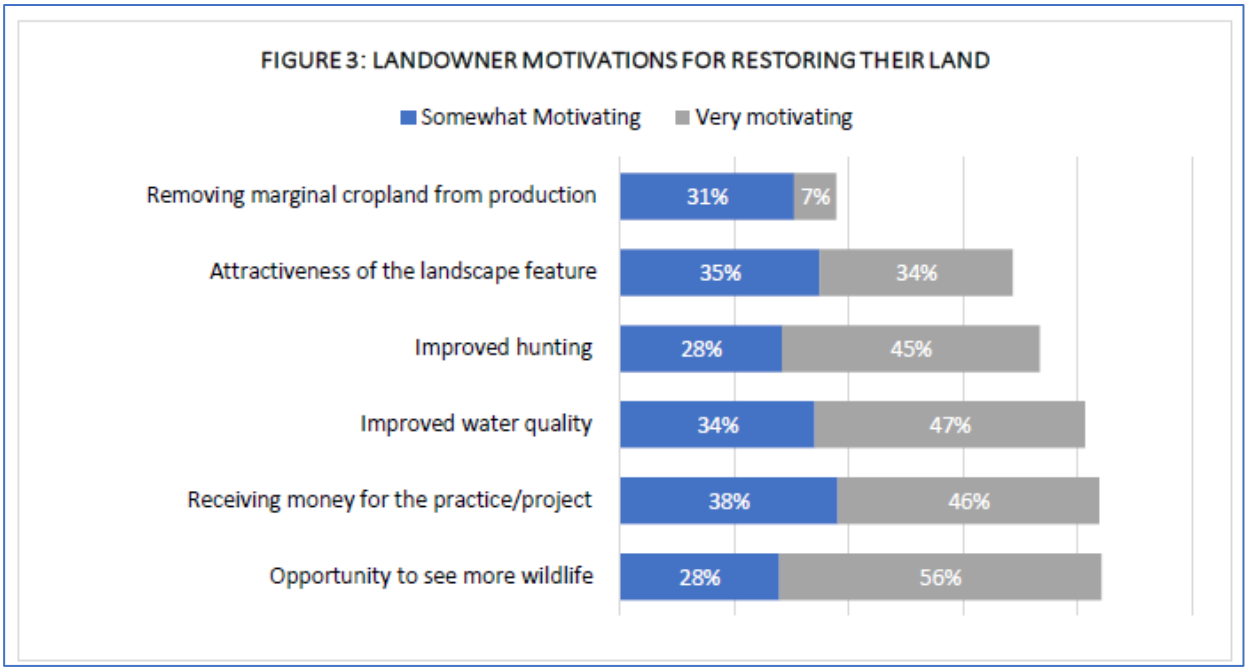
An impressive list of support documents and other Tree Trooper Resources are posted at: https://aawsa.org/tree-homeowner-resources.

Visual buffering is the number reason given by neighborhood residents for why they want to plant trees. Specifically, residents want trees that will create a more appealing view from their homes, especially trees that have some color. A close second reason is for ecosystem and habitat improvement followed by erosion control.

Delmarva Wetlands Partnership

The Nature Conservancy along with the United States Department of Agriculture Natural Resource Conservation Service, Ducks Unlimited, and the US Fish and Wildlife Service has formed The Delmarva Wetlands Partnership. Between February and April 2022, the Partnership sent a direct-mail letter and survey to 2,294 recipients who each owned parcels 10 acres or greater in priority restoration areas on the Delmarva peninsula. Survey methods and findings were reported in *Meeting the Bay's Wetland Goals: Insights from the Delmarva Wetland Partnership*.

Completed surveys were received from 383 of the landowners for a 16.3% response rate. The survey indicated that among these 383 landowners, "the dominant motivation to voluntarily

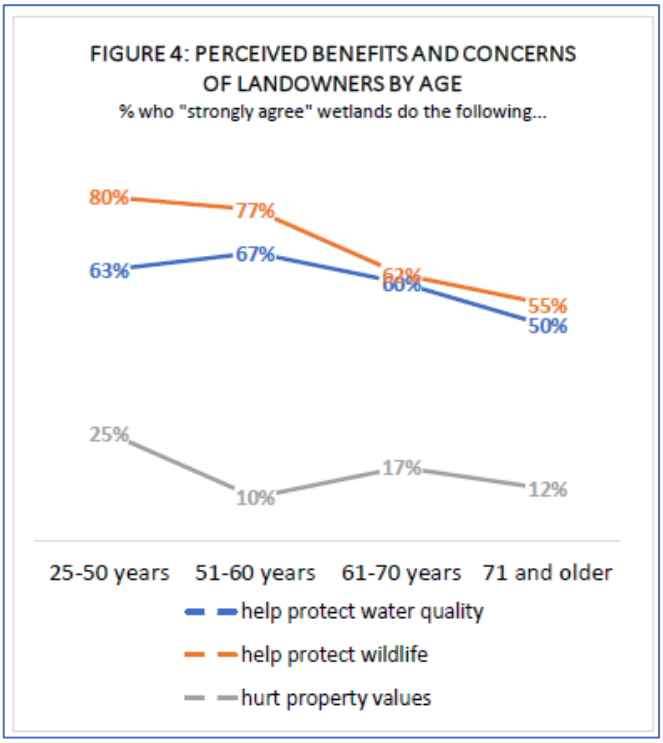


restore land is the opportunity to see more wildlife." Figure 3, below, shows that close second and third motivating factors for restoration on their land were "Receiving money for the practice/project" and "Improved water quality."

With regard to "receiving money" it was noted "Upon reading a description of restoration programs—and the potential to be paid to support wildlife and environmental quality through such programs—many survey-takers expressed interest in participating. Indeed, 225 respondents requested that we follow up with them to provide more information about these programs and their land's eligibility for participation."

Figure 4, on the next page, shows that perceived benefits and concerns vary considerably with landowner age. Generally, landowners in the 25- to 60-year age range agree at the highest rates that wetlands protect water quality and wildlife but a fraction of owners in this same range also believe wetlands hurt property value.

The survey revealed that "Nearly a quarter (22%) of survey respondents were already enrolled in some type of restoration program, with the most reported program being the Conservation Reserve Program (CRP) (14%)." The following rather surprising finding also emerged "However, the majority of landowners reported never having been contacted about the potential to enroll their land in a voluntary restoration program (65%)." Of the 65% of landowners who had never been contacted about restoration, an impressive 77% requested further information about restoration opportunities.



These finding points to the tremendous importance of increasing direct-outreach to landowners about restoration opportunities. Among the Next Steps listed at the end of the report was the need to refine outreach and engagement strategies. The following very important example illustrates this need:

> "We have learned that when practitioners are knowledgeable and can assist landowners in enrolling in a variety of restoration programs rather than only selling one program with their individual organization, more landowners advance projects."

The Delmarva Wetlands Partnership is in the process of bringing on additional staff to implement this and other Next Steps.

Frederick County, Maryland Creek ReLeaf Project

Creek ReLeaf has used multiple approaches to encourage land owners to plant trees on their property: ***social media*****,** mailings, tabling at events, rack cards, and presentations at service organization (Rotary, Lions, etc.) meetings.

At the Frederick County Creek ReLeaf webpage, the project is described as:

> "The Creek ReLeaf Program is designed to increase the total amount of forested area within Frederick County, including on privately owned lands and public properties. This project is funded in part by Maryland's Chesapeake & Atlantic Coastal Bays Trust Fund."

According to the Maryland's Five Million Trees Initiative tracking webpage, 38,742 trees have been planted in Frederick County. A portion of these trees were a product of the Creek ReLeaf project. As of 2024, trees have been planted on more than 584 acres through Creek ReLeaf. Creek ReLeaf is one of several Frederick County reforestation efforts. Creek ReLeaf is intended to partially fulfill the County's Municipal Separate Storm Sewer System (MS4) obligation. It is for this reason that Creek ReLeaf is overseen by the County's Department of Stormwater.

Creek ReLeaf has used multiple approaches to encourage land owners to plant trees on their property: social media, mailings, tabling at events, rack cards, and presentations at service organization (Rotary, Lions, etc.) meetings.

The letter posted at the following link was mailed to the land owners in the Catoctin Creek watershed with five acres or more of plantable property: https://app.box.com/s/ujhcv5q111j9p6bdkjg5a6pcerxfp5f0. The response rate for this letter was 1% to 2%.

A Creek ReLeaf post card was tested. The post card was mailed twice to 900 properties, 450 in Fall 2023 and 450 in Winter 2024. Just five of the recipients responded to the post card for a response rate of 0.6%. The postcard can be viewed at: https://app.box.com/s/brlylyd9pxelnjrkpbzzan8x6njqxfje.

Creek ReLeaf also seeks permanent conservation easements for tree planting areas. The County offers to pay owners up to $9,000 per acre for easements. Thus far over 31 private property owners have been reforested with conservation easements and over 13 public properties have been reforested since 2018, planting over 584 acres. The permanent conservation easement aspect of the program is not for everyone and can be a deterrent for some property owners.

Lastly, it was noted that a better tree survival rate has occurred since post-planting maintenance was increased to five years.

Howard County Stream Releaf

To participate in this program and receive plantings free of charge, a minimum of 12 trees or shrubs must be planted within 75 feet of a stream. The list of trees-shrubs and other program details are posted at: https://livegreenhoward.com/land/tree-programs/. Program staff provided the following answers to questions regarding direct-outreach.

1. **Have you ever used direct-mail or other outreach methods to contact owners of farms and other larger parcels about their interest in planting trees on their property? If yes, then I'm anxious to learn what approaches have worked best.**

   Yes, we direct mail letters and marketing materials to the owners of properties both large and small, as long as they have room to plant or increase a riparian buffer. We rely heavily on satellite imagery and GIS data to select such properties. I feel that post cards and brochures work best. I specifically designed our brochure so that an address label could be affixed directly to the outside with no need for an envelope. I found that letters were less successful as people often threw them out without even opening them.

2. **What benefits or other factors tend to prompt the land owners you work with to agree to plant trees on their property?**

   a. Visual buffering to provide a more appealing view from homes,
   b. Reducing the need to mow or perform other maintenance in lawn, pasture, or other areas,
   c. Financial incentives, or
   d. Reducing gullying on highly erodible lands.

   Our programs are free for the homeowner, so I believe that is a huge incentive toward participation. The reasons people usually discuss for participation are a., and b., above, as well as reducing erosion that is altering their property. That is not to say that some people don't also believe in the benefits to wildlife and the environment, and we always discuss those issues anyway, but for the most part people are looking to improve their property aesthetically and for low to no cost. Property tax reduction would also be a huge motivator. Although that is not something we offer, many have asked.

Following are links to Howard County Stream Releaf brochures and the mailer:

- Turf to Trees brochure: https://app.box.com/s/v52zlq4sg6jtms48ao2t7xni65x9cism
- Stream ReLeaf brochure: https://app.box.com/s/7xqc0cz8dfqtx58mr5lz6j7pz6an4rku
- Community Supported Forestry mailer: https://app.box.com/s/zesst5jfwrr7so9fk93l0eift9igo5mg

Maryland Forest Service

The Maryland Forest Service responded that…

"We have done multiple rounds of direct mail outreach for various tree planting programs over the years, with some success but only at low rates of response even with a lot of geographic targeting to identify eligible landowners. The Pennsylvania Department of Conservation and Natural Resources tried a social marketing approach based on digital profiles.

Financial incentives are usually the biggest draw, as long as they are not too complicated or cumbersome. There are usually multiple organizations and agencies that have reached out for tree planting interest, particularly in Central Maryland. The two avenues that have been

most successful in my opinion are a good article in the local paper with a nice picture and a well-respected local landowner who champions tree planting practices.

A phone conversation with the acting regional forester provided further insights."

OpinionWorks

Those participating in a January 30, 2024 discussion with OpinionWorks president and founder Steve Raabe were Gunpowder Valley Conservancy staff members Elizabeth Eakes and Karen Stupski along with Richard Klein, the author of this report.

Steve began by mentioning the larger study OpinionWorks did for the Chesapeake Bay Program recently, *Identifying Communications Needs to Increase Tree Planting and Maintenance*, which is posted at: https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/Tree-Planting-Maintenance-Public-Outreach-Report-112123.pdf

Next, Steve discussed the OpinionWorks report of findings, *Buffer Outreach Group: Prettyboy Watershed Alliance and Partners: Encouraging Streamside Buffering in Rural Watersheds*, is posted at: https://app.box.com/s/latbnlgz6o5ujcso0vxyaz7llvac96pw. The focus of the Prettyboy study was on ways of encouraging those who own three acres or more to plant more trees on their land. The target audience included farmers as well as those owning larger acreages who do not farm their land, but may lease their land to others to farm. The first phase of the study consisted of three focus groups with a total of 27 participants each who discussed riparian buffers. Next, there was a phone survey with calls made to 307 property owners. Most of these folks resided on their land and most owned less than 25 acres.

When the topic of the quality of the streams on or near their property came up, most thought the stream were in good condition and saw little need to improve water quality. However, obvious evidence of stream bank erosion was more convincing that a problem existed when compared to water quality data or less tangible indicators.

It would be helpful to couch text or statements regarding stream quality with language such as the following suggested by Richard Klein…

> While your stream is of good quality, increasing trees along the banks and elsewhere will make it considerably better, especially when it comes to slowing bank erosion and reducing excessive temperatures caused by the sun beating down on unshaded waters. This is of particular importance since many Gunpowder watershed streams support highly temperature sensitive trout.

Richard also suggested adding text complimenting farm owners for all they do to improve stream quality, perhaps like…

> It is clear from the widespread use of winter cover crops, minimum tillage with lots of erosion-preventing crop residue left on the soil surface, and other practices that Gunpowder watershed farm owners care a great deal about feeding us all and preserving stream quality.

Additionally, Gunpowder Valley Conservancy communications with the farming community should note the tremendous progress made in helping residents of the suburban portion of the watershed to improve the quality of their neighborhood streams.

It was important to provide evidence of the need for planting more trees such as scientific studies or references to tree benefits by organizations landowners trust like the Department of Natural Resources (DNR), Cooperative Extension Service, or the Soil Conservation District. This evidence could also come from a neighbor – someone the land owner knows – who can attest to the benefits.

The person who directly contacts land owners should be someone they can relate to. For example, since Kim Thomas grew up in the Hereford area and had lived on a multigenerational farm, she would be a good person to not only sign the initial letter but to make the initial direct contact with working farm owners. While a personalized letter is good for the initial contact, the number of land owners signing up for tree planting will be higher if a follow-up phone call is made.

Conservation and habitat-oriented groups like Trout Unlimited or the Izaak Walton League tend to be viewed more favorably by farm owners when compared to environmental organizations.

A question arose about using a rural return address on letterhead and envelopes such as one in Hereford as opposed to the Towson GVC post office box. It was unclear whether this would have more than a minor effect on the response rate. It might be worthy of a test at some point.

Following are the five key points that should be included in letters and discussions with land owners:

1. There will be no cost to owners for the trees, planting the trees, and for initial maintenance.
2. The owners must have a choice of tree species to be planted and where the plantings will occur.
3. The planting will substantially improve stream quality by slowing erosion and cooling temperature.

4. The plantings will not result in any negative financial consequences such as limiting future uses or the sale of their property, and
5. We should provide evidence that tree planting will improve stream quality from sources land owners are most inclined to trust such as the Department of Natural Resources (DNR), Cooperative Extension Service, or Soil Conservation District. Avoid citing regulatory agencies like USEPA or the Maryland Department of the Environment.

Riparian Forest Buffers Program, Pennsylvania Dept of Conservation & Natural Resources

The Pennsylvania Riparian Forest Buffers Program has been exploring a unique and innovative approach for direct-outreach to land owners who are most likely to plant trees. The approach is based on an analysis conducted by University of Montana professor Dr. Alex Metcalf and is described in the PA DCNR report *Prime Prospects Typologies Report from University of Montana*.

In the analysis the demographics of 2,259 Pennsylvania land owners who had planted riparian buffers was compared with a population of 7,708 land owners who had not. Demographic data from a commercial source was then obtained for the two populations. The data contained 800 variables for each owner in the two populations. The comparison indicated that owners with the following ten characteristics were *prime prospects* in that they had a higher propensity (likelihood) to carry out riparian restoration on their land:

1. They own at least a quarter-acre of plantable area,
2. They were retirees,
3. They had few or no children at home,
4. They were grandparents,
5. Their land was in a rural area,
6. They owned land that was greater in acreage than most others,
7. They had higher donation rates to religious, political, institutional, and, perhaps most importantly, environmental organizations,
8. With regard to political leanings, prime prospects are relatively neutral, reporting support for conservative and liberal causes on par with lower scoring landowners,
9. Prime prospects scored far above average when it came to reading religious, parenting, and business magazines, and
10. The four genres of music that scored the highest with prime prospects are Christian, country, classical, and big band.

In 2019, Dr. Metcalf and others published *Microtargeting for conservation* in the journal Conservation Biology. This paper appears to be based on same analysis summarized above but provides additional insights.

Penn State researchers ran a test to determine if direct-outreach to prime prospect land owners results in a significantly higher interest in riparian restoration when compared to randomly selected land owners. In this test, the same mailer was sent to 5,000 randomly selected land owners and 2,500 prime prospect land owners. Both groups owned riparian land with significant forest buffer gaps. The test showed an impressive 183% increase in response from prime prospects (22% response for prime prospects vs. 12% for the random selected land owners). The Penn State mailer is posted at: https://app.box.com/s/k5lpyjsupirt8c6kne1777vwrl30lw3c.

The following buffer benefits were emphasized in the mailer: clean water, stable streams, and abundant wildlife. The following text was also prominent "Most landowners, like you, invest in a riparian buffer." Three options were provided in the mailer for land owners to learn more:

- An 800 number,
- A web address, and
- A tear-off response post card.

The Riparian Forest Buffers and Lawn Conversion Program also tested the following mailers sent to prime prospects:

- First mailer: https://app.box.com/s/g4m9shbzjsjbo87amcrxym66sqeqxtew
- Follow up mailer: https://app.box.com/s/8dirtt35kh1iw4ty0v7era399zw5nypu

Combined, these two mailers produced a good response though it was not possible to quantify the response because other outreach was going on at the same, all of which produced so much interest that staff were a bit overwhelmed.

The follow-up mailer included the stream buffer endorsements from two well-known and respected land owners shown to the right. Mr. Rohrer was a prominent member of the farming community while Mr. Brown was a well-known nonfarming land owner. There was a very good response to these endorsements from respected land owners.

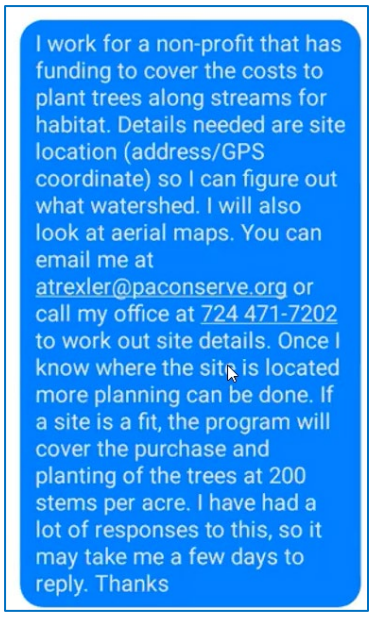
The Program also tested social media posts primarily on Facebook and Instagram. The text of the posts can be viewed at: https://app.box.com/s/y9hnlgl06fternmewqxthwfxxl783jl4. A new post occurred weekly for a five-week period from late July to early September, 2020. Posts that featured landowners and their stories performed the best. Unfortunately, program staff could not provide the actual response rate.

Western Pennsylvania Conservancy

As noted in the Western Pennsylvania Conservancy Riparian Tree Planting webpage, "Since 2001, WPC staff, with the help of partners and volunteers, have planted approximately 105,000 trees in rural and urban cities and towns across the region."

Direct-outreach to land owners has been done with the generic letter posted at: https://app.box.com/s/z69lqq2o03s4bvqhb5jmvhjcwmls40du. The response rate for the Conservancy's generic letter and that sent by partnering groups ranges from 5% to 15%. Response could be improved with a more personalized approach to a land owner including a map of their property. Most owners seldom look at a map or aerial of their land so they may need help accessing imagery of their land. Other approaches, such as leaving door-hangers on streamside homes, has been tested, but is time-consuming.

The greatest interest in tree-planting came from an ad placed on a local (Clearfield County, PA) Facebook Marketplace. The ad and the standard reply she created are pictured below.



This one ad got 7,540 clicks from not only local area residents but from those living throughout Pennsylvania and adjoining states. Thus far the ad has generated 400 requests for further information about tree planting. Most of the responses were from owners of land other than working farms. A number were from hunting and other sports land-owning groups or other owners of larger properties not in agricultural production.

It would help to include before and after photos to show how much more attractive a riparian area looks with trees.

The following will help working farm owners appreciate buffer benefits:

- A number of farm owners have shown interest in tree planting as a way to continue participating in the Conservation Reserve Enhancement Program (CREP), especially owners who received a notification from USDA about the need for additional practices,
- Working farm owners generally respond better to highlighting the soil health and livestock herd health benefits of buffers rather than reducing water pollution,
- It's been challenging to convince those cropping up to a stream edge to take a buffer area out of production by planting trees, and
- Showcasing a working farm owned by a big (well-known?) operator with an attractive forest buffer can be very effective in helping other agricultural operators appreciate the value added to their land by planting trees.

Most land owners, whether agricultural operators or others, tend to have low interest in tree-planting if a long-term agreement is involved. Generally, owners are more open to five-year agreements when compared to those lasting 25 years.

Research Papers

Following is a sampling of research into what direct-outreach methods have been successful in encouraging land owners to plant trees or implement other conservation practices. Several of the studies focused on the factors motivating land owners to implement practices.

Microtargeting for conservation (Metcalf et al., 2019)

A list of buffer restoration program participants was obtained from the Pennsylvania Department of Environmental Protection. Data was obtained from a commercial source regarding buffer participant history with respect to 800 variables such as age, gender, consumer behavior, property-level attributes, voting history, and commercial interests. This analysis indicated that buffer restoration program participants were more likely to be:

- Male,
- Older,
- Owners of large properties,
- Purchased their home after 1960,
- Did not own an exotic car,
- Had lower purchase prices, and
- Have larger square-foot houses.

In fact, the likelihood that landowners scoring highest with regard to the factors listed above were 2.3 times more likely to have participated in a buffer program when compared to the average.

In 2022, Penn State tested these findings through a mailing to landowners scoring highest with regard to the above factors and a randomly selected sampling of landowners. Of the high scoring (prime prospect) direct-mail recipients, 22% expressed interest in buffer programs vs. 12% of the randomly selected recipients. For further detail see *Riparian Forest Buffers and Lawn Conversion Programs, Pennsylvania Department of Conservation and Natural Resources*, on page 26 of this report.

Using Social Marketing to Engage Extension Audiences: Lessons from an Effort Targeting Woodland Owners (Rickenback et al., 2017)

A test was conducted of three direct-mail social marketing campaigns for helping Wisconsin woodland owners improve sustainable management of their forests. In the mailings, owners were asked if they would like an 80-page handbook or to walk their woodland with a professional forester. It appears the recipients were identified through the National Woodland Owner Survey and marketing data. The following categories of *prime prospect* owners – those most likely to respond – received mailings:

- owners who "work the land",
- owners who view their woodland as a retreat, and
- those with a high-hunting score.

The direct-mail campaign consisted of a postcard, followed a week later by a brochure, then two-weeks after that a personalized letter with an enclosed postage-paid reply card, and three-weeks after that a brochure was again mailed. All mailings had first-class postage. Recipients were

segmented into those owning small-, medium-, and large-size woodlands About 17% of the recipients requested a handbook and 4% opted to walk their woodland with a forester.

Adoption of agricultural conservation practices in the United States: Evidence from 35 years of quantitative literature (Prokopy et al., 2019)
The abstract noted the following correlations between farmers in the U.S. who adopted conservation practices based on a review of studies from 1982 to 2017:

> "Analyses showed that variables positively associated with adoption include the farmer self-identifying primarily as stewardship motivated or otherwise nonfinancially motivated, environmental attitudes, a positive attitude toward the particular program or practice, previous adoption of other conservation practices, seeking and using information, awareness of programs or practices, vulnerable land, greater farm size, higher levels of income and formal education, engaging in marketing arrangements, and positive yield impact expected. Some variables often thought to be important, such as land tenure, did not emerge as consistently important in this cross-study review."

Assessing intervention effectiveness at promoting voluntary conservation practice adoption in agrienvironments (Read and Wainger, 2022)
A review of 146 empirical studies from around the world of interventions prompting the implementation of conservation practices on farms and forests revealed that "Financial incentives had the strongest evidence of increasing producers' likelihood of adopting conservation practices."

Understanding Farmer Motivation and Attitudes Regarding the Adoption of Specific Soil Best Management Practices (Weber, 2017)
The author reviewed research conducted in Canada, the U.S., and elsewhere to identify factors which may influence the decision of Canadian farmers to adopt Best Management Practices (BMPs) for climate change. Farmers decisions to adopt BMPs is a two-step process where first non-economic factors motivate a desire to adopt BMPs then economic factors are important to actual implementation. While it is important to expand awareness of environmental impacts and BMP effectiveness in mitigating impacts, efforts to increase BMP implementation should focus first on those farm owners most likely to act and strengthen community-based social networks to encourage BMP adoption.

Conservation fundraising: Evidence from social media and traditional mail field experiments (Kubo et al., 2022)
In this study conducted among residents of Japan, a comparison of fundraising success to preserve a forest showed that direct-mail out performed social media: "We compared three types of message frames (simple, seed money, and ecological). We found that the seed money frame, which emphasizes the amount already donated, increased the number of donors, whereas the ecological frame, which focuses on the fact that the fundraiser benefits threatened species, led to a relative reduction in the number of donors. We also found that while Facebook advertising costs exceeded donations, while the opposite was true for the traditional mail experiment."

CANDIDATE TREE PLANTING PRIORITY PARCELS

For the reasons provided in this document, owners of parcels with the following characteristics were recommended as a priority for tree-planting direct-outreach:

A. There are at least 0.5-acres of riparian and/or at least 1.0-acres of upland tree-planting area based on the Plantable Areas layer created by the Chesapeake Conservancy Conservation Innovation Center, ***and***

B. These Plantable Areas are located:
   i. In riparian areas (those within 100-feet of a stream bank top or shoreline), ***or***
   ii. On floodplain areas, ***or***
   iii. On steep slopes (those rising 15- to 25-feet or more vertically for every 100 feet of horizontal distance), ***and***

C. Wetlands are ***absent*** based on the MERLIN Wetlands layer, unless the wetland occupies a small portion of the parcel in which case the owner would be discouraged from altering wetland functions by planting trees in the wetland.

An Initial Discussion of Candidate Site Selection Criteria

During the January 16th Zoom meeting with Conservancy staff and Board members the PowerPoint posted at the following address was used to illustrate one possible set of candidate tree-planting parcel identification criteria: https://app.box.com/s/uozebctajzsvyiephotce7bu2w7vcjdg.

It was agreed that the factors used to select candidate sites must come reasonably close to locating sites where it is highly probable that the following minimum tree-planting areas are present - 0.5-acre riparian or 1.0-acre upland – and other GVC priorities are likely met. Afterall, we do not want to gain the interest of a land owner only to find that their property is unsuitable for tree planting. On the other hand, we do not want a selection process so time-consuming that it becomes burdensome.

MERLIN & Other Online Tree-Planting Site Selection Tools

It was proposed that MERLIN (*Maryland's Environmental Resources and Land Information Network*) be used to identify the 100-candidate tree-planting parcels with the following layers activated:

- The Plantable Areas layer created by the Chesapeake Conservancy Conservation Innovation Center. In *Technical Study on Changes in Forest Cover and Tree Canopy in Maryland*, "**Plantable Area** is defined as existing low vegetation and barren land cover and excluding areas generally unsuitable areas for planting trees such as roads, buildings, other impervious areas, wetlands and open water and certain features (e.g., airports, prime agricultural soils, powerline right of ways, important bird area grasslands and areas within a 15-foot buffer of buildings)."

- The Maryland Forests - Forested Buffers layer showing riparian areas which are areas within 100 feet of a stream bank or shoreline.

- The State Department of Assessments and Taxation (SDAT) Parcel Boundary layer, a source of property ownership data.

- The MERLIN Wetlands layer, and

- The NAIP Imagery 2018.

With MERLIN and the layers listed above, it takes a half-hour to 45-minutes to:

A. Identify a candidate tree-planting parcel, then

B. Record the ownership data used to personalize then mail each letter, and

C. Create an aerial showing possible tree planting areas on each parcel. The map would accompany each letter.

Recommended Specific Candidate Tree-Planting Site Selection Criteria

Following is further detail regarding the factors used to identify landowners to be offered Conservancy tree-planting assistance via direct-mail.

Rural Sites

The Conservancy directed that this effort focus on potential tree-planting sites located in the rural portions of the Gunpowder watershed, as opposed to suburban-urban areas.

Online Screening Site Selection Criteria

The Plantable Areas layer created by the Chesapeake Conservancy Conservation Innovation Center must show that a parcel contains ***at least***:

a. 0.5-acres of plantable riparian (within 100 feet of a stream bank) area based on the Maryland Forests - Forested Buffers layer, ***or***

b. At least 1.0-acres of upland plantable area, ***and***

c. If MERLIN shows that wetlands are present within a plantable area then the parcel would **NOT** be selected as one of the 100 direct-outreach candidate tree-planting sites, ***unless*** the wetland accounts for a small portion of the plantable area.

Sites Where Owners Are More Likely to Agree to Plant Trees

It was thought that land owners would be most likely to agree to plant trees in areas that are **NOT** currently in use as lawn, pasture, cropland, etc. These natural areas would include floodplains or steep slopes where trees are absent or sparse and where it is impractical to use the area for building, farming, etc. Such a natural area may be populated with a scattering of trees, grasses that have not

been mowed for years, or with unmaintained herbaceous vegetation. Below are photos illustrating two of these "natural" areas.


Little Falls floodplain natural area, White Hall


Little Falls floodplain natural area upstream of I-83

Focus On Sites Where Tree-Plantings Will Provide Substantial Ecological Benefits

It was agreed that priority be given to tree planting on areas where ecological benefits will be considerable such as riparian areas, elsewhere on floodplains, and on steep slopes (especially valley walls). Various Maryland regulations define a steep slope as rising or falling 15 feet or more vertically over a horizontal distance of a hundred feet. In this context, slope gradient is expressed as a percent (e.g. 15%).

According to the Maryland Department of the Environment Designated Use Classes for Maryland's Surface Waters interactive map, most of the streams in the rural portions of the Gunpowder watershed are protected as Nontidal Cold Waters. These waters may support naturally-reproducing trout populations. Trout are very sensitive to the water temperature increase resulting from a lack of trees to shade a stream from the heating rays of the sun; hence the benefit of riparian tree planting which also reduces stream bank erosion. Riparian and floodplain trees are also an essential source of the organic matter (leaves, twigs, etc.) that drive stream food-chains, especially in headwater areas. For further detail on this topic see *Land Use Characteristics of Trout Watersheds in Maryland.*

Soil erosion rates are generally highest on steep slopes, which frequently occupy the valley walls adjoining floodplains. The close proximity of steep valley walls ensure that a large percentage of soils eroded from these hillsides are delivered to a stream. The topography (contour lines) shown on the MERLIN base map allows identification of plantable areas on steeper slopes.

Legacy Sediments & Tree Survival

Concern was expressed about the survival of trees planted on legacy sediments. While there was a basis for this concern a decade or so ago, recent research and the experience of the Alliance for the Chesapeake Bay as well as the Stroud Water Research Center indicates that with new planting-maintenance methods acceptable survival rates are achieved when trees are planted on legacy sediments. Following is the basis for this statement.

Several online databases were searched using keywords such as *legacy sediment* and *tree planting failure*. Two scientific studies implied a 95% mortality of trees planted in legacy sediments:

- 2001 *Anthropocene streams and base-level controls from historic dams in the unglaciated mid-Atlantic region, USA*, and
- 2009 *Preliminary Reconstruction of a Pre-European Settlement Valley Bottom, Wetland, Southeastern Pennsylvania*.

Both above studies reference the same failed tree planting project on legacy sediments which took place along Big Spring Run in Pennsylvania.

A more recent (2019) study conducted along the Middle Branch of White Clay Creek, also in Pennsylvania, documented a much higher survival rate of trees planted in legacy sediments, *Forest restoration on floodplains mantled with legacy sediments - removing sediments appears unnecessary for successful restoration*.

Organizations engaged in tree planting throughout the Chesapeake Bay watershed were contacted to learn what their experience had been with tree survival on legacy sediments. Ryan Davis, who is the Chesapeake Forests Program Manager for the Alliance for the Chesapeake Bay, he responded...

> "Happy to fill you in on our experience! If the proper maintenance regime is followed, we find legacy sediment sites to be **easy** to establish trees on. Those legacy sediments are former topsoil and tend to be pretty rich. They aren't as wet as you may expect soil to be right next to a creek, and I wonder if that was a problem in those two studies [cited above]; if you plant hydrophytic vegetation on mesic/dry soils, you may not get high success rates. Also, we didn't know the "recipe" for proper maintenance (mowing, reducing vole cover around trees with herbicide) until the late 2000's, and many of the sites planted before then did not fare well, no matter the soil they were planted on.
>
> Stroud Water Research Center has peer-reviewed studies on afforestation success on legacy sediment soils; Lamonte Garber (lgarber@stroudcenter.org) would be a good person to reach out to about the studies and his experience, which is parallel to mine."

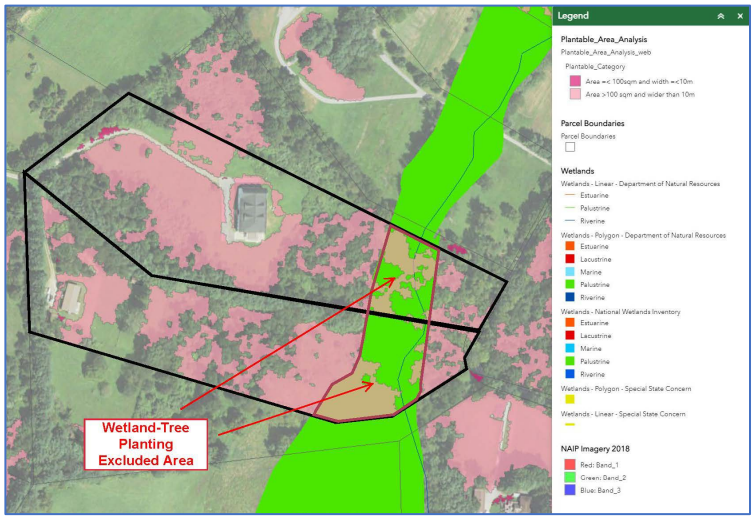
In response to an email, Mr. Garber wrote…

"We have been testing tree establishment on legacy sediments through a combination of field trials and the research project you mentioned [the 2019 study]. We are finding no evidence for the statement that legacy sediments are poorly suited to buffers. To the contrary and as I have explained to some of the folks involved in the Big Spring study [cited above], a much more likely explanation for poor tree survival at their site (and perhaps other such sites) was inadequate maintenance leading to mortality from rodent and deer herbivory, non-target plant competition or problems related to shelter management. These are challenges that are in play in nearly all rural settings for riparian plantings regardless of soil type.

Ryan's perspective, which has been our extensive experience too, is that contrary to such statements, legacy sediments appear to be highly suited to reforestation for the reasons he describes. Perhaps there are other environmental risks associated with legacy sediments, but inherently poor riparian buffer success is not one of them."

Wetlands

Planting trees in wetland areas could impair important ecological functions. This is particularly true of the wetlands favored by the federally threatened Bog Turtle which can occur throughout the Gunpowder watershed. It was agreed we should exclude parcels as candidate tree-planting sites if the MERLIN wetland layer indicates wetlands area present. However, if a parcel contains plantable areas and only a small portion of the parcel is shown as wetland, then it was agreed it should be considered as a possible candidate for tree planting. Below is an illustration of two such parcels.



Both parcels are residential and about eight-acres in area. More than half of each parcel is highlighted pink, *plantable area*. About 10% of the plantable area overlaps the green wetland area. Both parcels contain plantable areas on steep slopes (15% - 20%) that are outside wetland boundaries. Should the owner of either parcel express interest then Conservancy staff could

discourage tree planting in wetland areas during the site visit and encourage conversion of the steep slopes and other non-wetland areas to forest.

Gunpowder Watershed Candidate Tree-Planting Sites

		PERCENT OF ACRES PLANTABLE		PLANTABLE ACRES		PLANTABLE PRIORITY OR EXCLUSION AREAS 1=Yes 0=No				OWNERSHIP		RESPONDED TO LETTER AS INTERESTED IN TREE-PLANTING										PLANTABLE AREAS VERIFICATION		
MERLIN MAP	PARCEL ACRES	Riparian[1]	Upland[2]	Riparian[1]	Upland[2]	Riparian	Floodplain	Steep Slope	Percent Wetland - Plantable Area	Private Individuals	Primary Residence	By Phone	Via GVC Website	By Response Card	By Email	Other	Address Confirmed With Voter Data	STREAM	12-DIGIT WATERSHED	12-DIGIT WATERSHED NAME	COUNTY	Within View of Public Roads	Plantable Acres Verified From Nearby Roads	Plantable Acres Verified From 2023-24 Aerial Images
AA	26.87	10%	5%	2.69	1.34	1	1	1	0%	Yes	Yes						✓	along Little Falls	021308050312	Upper Little Falls	Baltimore	Yes	Yes	Yes
AB	5.10	30%	10%	1.53	0.51	1	1	0	0%	Yes	Yes	1					✓	along Little Falls	021308050312	Upper Little Falls	Baltimore	Yes	Yes	Yes
AC	13.02	15%	10%	1.95	1.30	1	1	1	0%	Yes	Yes						✓	along Little Falls	021308050312	Upper Little Falls	Baltimore	No	NA	Yes
AD	25.60	20%	5%	5.12	1.28	1	1	1	0%	Yes	Yes						✓	along Little Falls	021308050312	Upper Little Falls	Baltimore	Yes	Yes	Yes
AE	11.00	0%	60%	0.00	6.60	0	0	1	0%	Yes	Yes						✓	near Bee Tree Run	021308050312	Upper Little Falls	Baltimore	Yes	Yes	Yes
AF	18.01	0%	25%	0.00	4.50	0	0	1	0%	Yes	Yes						✓	near Little Gunpowder Falls	021308040298	Lower Little Gunpowder Falls	Baltimore	Yes	Yes	Yes
AG	3.03	0%	80%	0.00	2.42	0	0	1	0%	Yes	Yes						✓	near Little Gunpowder Falls	021308040298	Lower Little Gunpowder Falls	Baltimore	Yes	Yes	Yes
AH	5.00	0%	85%	0.00	4.25	0	0	0	0%	Yes	Yes						✓	near Little Gunpowder Falls	021308040298	Lower Little Gunpowder Falls	Baltimore	Yes	Yes	Yes
AI	14.28	5%	25%	0.71	3.57	1	1	1	0%	Yes	Yes						X	along a Little Gunpowder tributary	021308040298	Lower Little Gunpowder Falls	Baltimore	Yes	Yes	Yes
AJ	3.24	0%	90%	0.00	2.92	0	0	1	0%	Yes	Yes						✓	in the Little Gunpowder Falls watershed	021308040298	Lower Little Gunpowder Falls	Baltimore	Yes	Yes	Yes
AK	14.47	20%	60%	2.89	8.68	1	1	1		Yes	Yes						✓	along Dulaney Valley Branch	021308050300	Lower Loch Raven Reservoir	Baltimore	Yes	Yes	Yes
AL	22.66	10%	60%	2.27	13.60	1	1	0	0%	Yes	Yes	1					✓	along Fitzhugh Run	021308050300	Lower Loch Raven Reservoir	Baltimore	No	Not Applicable	Yes
AM	3.97	0%	45%	0.00	1.78	0	0	1	20%	Yes	Yes						✓	in the Loch Raven watershed	021308050300	Lower Loch Raven Reservoir	Baltimore	No	Not Applicable	Yes
AN	35.62	5%	45%	1.78	16.03	1	1	0	2%	Yes	Yes	1					✓	along Cowen Run	021308020297	Big Gunpowder Falls Below Loch Raven	Baltimore	No	Not Applicable	Yes
AO	24.25	2%	23%	0.49	5.58	1	1	1	0%	Yes	Yes						✓	along Long Green Creek	021308020297	Big Gunpowder Falls Below Loch Raven	Baltimore	Yes	Yes	Yes
AP	2.10	3%	50%	0.06	1.05	1	1	1	5%	Yes	Yes						✓	along Long Green Creek	021308020297	Big Gunpowder Falls Below Loch Raven	Baltimore	No	Not Applicable	Yes

		PERCENT OF ACRES PLANTABLE		PLANTABLE ACRES		PLANTABLE PRIORITY OR EXCLUSION AREAS 1=Yes 0=No				OWNERSHIP		RESPONDED TO LETTER AS INTERESTED IN TREE-PLANTING										PLANTABLE AREAS VERIFICATION		
MERLIN MAP	PARCEL ACRES	Riparian[1]	Upland[2]	Riparian[1]	Upland[2]	Riparian	Floodplain	Steep Slope	Percent Wetland - Plantable Area	Private Individuals	Primary Residence	By Phone	Via GVC Website	By Response Card	By Email	Other	Address Confirmed With Voter Data	STREAM	12-DIGIT WATERSHED	12-DIGIT WATERSHED NAME	COUNTY	Within View of Public Roads	Plantable Acres Verified From Nearby Roads	Plantable Acres Verified From 2023-24 Aerial Images
AQ	7.67	10%	20%	0.77	1.53	1	1	1	0%	Yes	Yes						✓	along Haystack Branch	021308020297	Big Gunpowder Falls Below Loch Raven	Baltimore	Yes	Yes	Yes
AR	3.87	20%	40%	0.77	1.55	1	1	0	0%	Yes	Yes						✓	along Cowen Run	021308020297	Big Gunpowder Falls Below Loch Raven	Baltimore	No	Not Applicable	Yes
AS	41.80	5%	25%	2.09	10.45	1	1	1	1%	Yes	Yes						✓	along Western Run	021308050303	Western Run	Baltimore	Yes	Yes	Yes
AT	111.76	2%	3%	2.24	3.35	1	1	0	0%	Yes	Yes	1					X	along Western Run	021308050303	Western Run	Baltimore	Yes	Yes	Yes
AU	8.75	10%	35%	0.88	3.06	1	1	0	2%	Yes	Yes				1		X	along Western Run	021308050303	Western Run	Baltimore	Yes	Yes	Yes
AV	4.00	20%	40%	0.80	1.60	1	1	0	0%	Yes	Yes						✓	along Delaware Run	021308050303	Western Run	Baltimore	Yes	Yes	Yes
AW	6.36	25%	5%	1.59	0.32	1	1	1	0%	Yes	Yes						X	along Blackrock Run	021308050303	Western Run	Baltimore	Yes	Yes	Yes
AX	3.87	35%	35%	1.35	1.35	1	1	1	0%	Yes	Yes	1					✓	along Blackrock Run	021308050307	Blackrock Run	Baltimore	Yes	Yes	Yes
AY	4.74	30%	40%	1.42	1.90	1	1	0	0%	Yes	Yes						✓	along Blackrock Run	021308050307	Blackrock Run	Baltimore	Yes	Yes	Yes
AZ	6.54	10%	25%	0.65	1.64	1	1	1	0%	Yes	Yes	1		0			✓	along Blackrock Run	021308050307	Blackrock Run	Baltimore	Yes	Not Applicable	Yes
BA	139.32	5%	5%	6.97	6.97	1	1	1	1%	Yes	Yes						✓	along Blackrock Run	021308050307	Blackrock Run	Baltimore	Yes	Yes	Yes
BB	46.71	7%	3%	3.27	1.40	1	1	1	0%	Yes	Yes						X	along Blackrock Run	021308050307	Blackrock Run	Baltimore	Yes	Yes	Yes
BC	5.94	5%	20%	0.30	1.19	1	1	0	0%	Yes	Yes						✓	along Western Run	021308050308	Piney Run	Baltimore	Yes	Yes	Yes
BD	23.45	20%	30%	4.69	7.03	1	1	0	0%	Yes	Yes						✓	along McGill Run	021308050308	Piney Run	Baltimore	No	Not Applicable	Yes
BE	21.09	3%	7%	0.63	1.48	1	1	0	0%	Yes	Yes						✓	along Piney Run	021308050308	Piney Run	Baltimore	No	Not Applicable	Yes
BF	11.50	10%	20%	1.15	2.30	1	1	0	3%	Yes	Yes						✓	along Piney Run	021308050308	Piney Run	Baltimore	Yes	Yes	Yes
BG	13.13	0%	20%	0.00	2.63	1	1	0	0%	Yes	Yes						✓	along McGill Run	021308050308	Piney Run	Baltimore	No	Not Applicable	Yes

		PERCENT OF ACRES PLANTABLE		PLANTABLE ACRES		PLANTABLE PRIORITY OR EXCLUSION AREAS 1=Yes 0=No				OWNERSHIP		RESPONDED TO LETTER AS INTERESTED IN TREE-PLANTING										PLANTABLE AREAS VERIFICATION		
MERLIN MAP	PARCEL ACRES	Riparian[1]	Upland[2]	Riparian[1]	Upland[2]	Riparian	Floodplain	Steep Slope	Percent Wetland - Plantable Area	Private Individuals	Primary Residence	By Phone	Via GVC Website	By Response Card	By Email	Other	Address Confirmed With Voter Data	STREAM	12-DIGIT WATERSHED	12-DIGIT WATERSHED NAME	COUNTY	Within View of Public Roads	Plantable Acres Verified From Nearby Roads	Plantable Acres Verified From 2023-24 Aerial Images
BH	5.73	10%	50%	0.57	2.87	1	1	0	0%	Yes	Yes						✓	along Gunpowder Falls	021308050306	Monkton-Bush Cabin	Baltimore	Yes	Yes	Yes
BI	7.52	0%	30%	0.00	2.26	0	1	1	0%	Yes	Yes						✓	along Charles Run	021308050306	Monkton-Bush Cabin	Baltimore	Yes	Yes	Yes
BJ	30.53	1%	15%	0.31	4.58	1	1	1	0%	Yes	Yes						✓	along an unnamed Gunpowder tributary	021308050306	Monkton-Bush Cabin	Baltimore	No	Not Applicable	Yes
BK	11.87	10%	30%	1.19	3.56	1	1	1	0%	Yes	Yes						✓	along Charles Run	021308050306	Monkton-Bush Cabin	Baltimore	No	Not Applicable	Yes
BL	71.06	5%	4%	3.55	2.84	1	1	1	0%	Yes	Yes						X	along Little Falls	021308050309	Little Falls & Mine Branches	Baltimore	Yes	Yes	Yes
BM	23.18	12%	8%	2.78	1.85	1	1	1	0%	Yes	Yes						✓	along First Mine Branch	021308050309	Little Falls & Mine Branches	Baltimore	Yes	Yes	Yes
BN	22.05	1%	9%	0.22	1.98	1	1	1	0%	Yes	Yes		1				✓	along Second Mine Branch	021308050309	Little Falls & Mine Branches	Baltimore	No	Not Applicable	Yes
BO	9.81	7%	13%	0.69	1.28	1	1	1	0%	Yes	Yes						✓	along Third Mine Branch	021308050309	Little Falls & Mine Branches	Baltimore	No	Not Applicable	Yes
BP	2.87	50%	0%	1.44	0.00	1	1	0	0%	Yes	Yes						✓	along Fourth Mine Branch	021308050309	Little Falls & Mine Branches	Baltimore	Yes	Yes	Yes
BQ	120.56	2%	15%	2.41	18.08	1	1	1	0%	Yes	Yes						✓	along Third Mine Branch	021308050309	Little Falls & Mine Branches	Baltimore	No	Not Applicable	Yes
BR	10.94	0%	30%	0.00	3.28	0	0	1	0%	Yes	Yes						X	in the Beetree Run watershed	021308050311	Beetree Run	Baltimore	No	Not Applicable	Yes
BS	24.89	0%	5%	0.00	1.24	0	0	1	0%	Yes	Yes						✓	along Beetree Run	021308050311	Beetree Run	Baltimore	No	Not Applicable	Yes
BT	20.71	4%	6%	0.83	1.24	1	1	1	0%	Yes	Yes						✓	along Owl Branch	021308050310	Little Falls - Owl Branch	Baltimore	No	Not Applicable	Yes
BU	10.27	5%	25%	0.51	2.57	1	1	1	0%	Yes	Yes				1		✓	along Owl Branch	021308050310	Little Falls - Owl Branch	Baltimore	No	Not Applicable	Yes
BV	2.05	10%	60%	0.21	1.23	1	1	1	0%	Yes	Yes						✓	along Owl Branch	021308050310	Little Falls - Owl Branch	Baltimore	Yes	Yes	Yes
BW	8.90	18%	12%	1.60	1.07	1	1	1	0%	Yes	Yes						X	along Owl Branch	021308050310	Little Falls - Owl Branch	Baltimore	Yes	Yes	Yes
BX	4.86	15%	10%	0.73	0.49	1	1	1	0%	Yes	Yes						✓	along Owl Branch	021308050310	Little Falls - Owl Branch	Baltimore	No	Not Applicable	Yes

		PERCENT OF ACRES PLANTABLE		PLANTABLE ACRES		PLANTABLE PRIORITY OR EXCLUSION AREAS 1=Yes 0=No				OWNERSHIP		RESPONDED TO LETTER AS INTERESTED IN TREE-PLANTING										PLANTABLE AREAS VERIFICATION		
MERLIN MAP	PARCEL ACRES	Riparian[1]	Upland[2]	Riparian[1]	Upland[2]	Riparian	Floodplain	Steep Slope	Percent Wetland - Plantable Area	Private Individuals	Primary Residence	By Phone	Via GVC Website	By Response Card	By Email	Other	Address Confirmed With Voter Data	STREAM	12-DIGIT WATERSHED	12-DIGIT WATERSHED NAME	COUNTY	Within View of Public Roads	Plantable Acres Verified From Nearby Roads	Plantable Acres Verified From 2023-24 Aerial Images
BY	20.68	10%	10%	2.07	2.07	1	1	1	0%	Yes	Yes	1					X	along Compass Run	021308060313	Prettyboy Reservoir	Baltimore	No	Not Applicable	Yes
BZ	36.96	10%	10%	3.70	3.70	1	1	1	0%	Yes	Yes						✓	along Poplar Run	021308060313	Prettyboy Reservoir	Baltimore	No	Not Applicable	Yes
CA	3.00	20%	10%	0.60	0.30	1	1	1	0%	Yes	Yes						✓	along Poplar Run	021308060313	Prettyboy Reservoir	Baltimore	No	Not Applicable	Yes
CB	5.25	20%	30%	1.05	1.58	1	1	1	0%	Yes	Yes						✓	along Dykes Creek	021308060313	Prettyboy Reservoir	Baltimore	Yes	Yes	Yes
CC	5.17	10%	20%	0.52	1.03	1	1	1	0%	Yes	Yes						✓	along Dykes Creek	021308060313	Prettyboy Reservoir	Baltimore	Yes	Yes	Yes
CD	8.40	10%	30%	0.84	2.52	1	1	1	0%	Yes	Yes						✓	along Peggys Run	021308060314	Georges Run	Baltimore	No	Not Applicable	Yes
CE	5.61	5%	30%	0.28	1.68	1	1	1	0%	Yes	Yes						✓	along Georges Run	021308060314	Georges Run	Baltimore	Yes	Yes	Yes
CF	96.04	5%	5%	4.80	4.80	1	1	0	0%	Yes	Yes						✓	along Georges Run	021308060314	Georges Run	Baltimore	No	Not Applicable	Yes
CG	4.95	10%	10%	0.50	0.50	1	1	1	0%	Yes	Yes						✓	along Carroll Branch	021308050304	Carroll Branch	Baltimore	No	Not Applicable	Yes
CH	5.22	15%	15%	0.78	0.78	1	1	0	0%	Yes	Yes						✓	along My Lady's Manor Branch	021308050304	Carroll Branch	Baltimore	Yes	Yes	Yes
CI	11.88	0%	30%	0.00	3.56	0	0	1	0%	Yes	Yes						✓	along Carroll Branch	021308050304	Carroll Branch	Baltimore	No	Not Applicable	Yes
CJ	19.83	0%	70%	0.00	13.88	0	0	1	0%	Yes	Yes						X	along an unnamed Gunpowder tributary	021308050304	Carroll Branch	Baltimore	No	Not Applicable	Yes
CK	11.50	10%	40%	1.15	4.60	1	1	1	0%	Yes	Yes						✓	along Piney Creek	021308050305	Piney Creek	Baltimore	Yes	Yes	Yes
CL	10.51	10%	40%	1.05	4.20	1	1	1	0%	Yes	Yes						✓	along Piney Creek	021308050305	Piney Creek	Baltimore	Yes	Yes	Yes
CM	5.57	10%	10%	0.56	0.56	1	1	1	0%	Yes	Yes						✓	along Piney Creek	021308050305	Piney Creek	Baltimore	Yes	Yes	Yes
CN	29.53	5%	5%	1.48	1.48	1	1	1	0%	Yes	Yes						✓	along Piney Creek	021308050305	Piney Creek	Baltimore	Yes	Yes	Yes
CO	44.40	10%	10%	4.44	4.44	1	1	1	0%	Yes	Yes						✓	along Piney Creek	021308050305	Piney Creek	Baltimore	No	Not Applicable	Yes

		PERCENT OF ACRES PLANTABLE		PLANTABLE ACRES		PLANTABLE PRIORITY OR EXCLUSION AREAS 1=Yes 0=No				OWNERSHIP		RESPONDED TO LETTER AS INTERESTED IN TREE-PLANTING										PLANTABLE AREAS VERIFICATION		
MERLIN MAP	PARCEL ACRES	Riparian[1]	Upland[2]	Riparian[1]	Upland[2]	Riparian	Floodplain	Steep Slope	Percent Wetland - Plantable Area	Private Individuals	Primary Residence	By Phone	Via GVC Website	By Response Card	By Email	Other	Address Confirmed With Voter Data	STREAM	12-DIGIT WATERSHED	12-DIGIT WATERSHED NAME	COUNTY	Within View of Public Roads	Plantable Acres Verified From Nearby Roads	Plantable Acres Verified From 2023-24 Aerial Images
CP	1.60	35%	10%	0.56	0.16	1	1	1	0%	Yes	Yes						✓	along Overshot Run	021308050301	Upper Loch Raven Reservoir	Baltimore	Yes	Yes	Yes
CQ	23.89	5%	25%	1.19	5.97	1	1	1	0%	Yes	Yes				1		✓	along Overshot Run	021308050301	Upper Loch Raven Reservoir	Baltimore	No	Not Applicable	Yes
CR	5.78	10%	10%	0.58	0.58	1	1	0	0%	Yes	Yes						✓	along Overshot Run	021308050301	Upper Loch Raven Reservoir	Baltimore	No	Not Applicable	Yes
CS	4.37	15%	20%	0.66	0.87	1	1	1	0%	Yes	Yes						✓	along Overshot Run	021308050301	Upper Loch Raven Reservoir	Baltimore	Yes	Yes	Yes
CT	1.87	30%	10%	0.56	0.19	1	1	0	0%	Yes	Yes						✓	along Greene Branch	021308050301	Upper Loch Raven Reservoir	Baltimore	No	Not Applicable	Yes
CU	9.93	15%	45%	1.49	4.47	1	1	0	0%	Yes	Yes						✓	along Baisman Run	021308050302	Beaverdam Run	Baltimore	No	Not Applicable	Yes
CV	4.22	15%	25%	0.63	1.06	1	1	0	0%	Yes	Yes						✓	along Baisman Run	021308050302	Beaverdam Run	Baltimore	No	Not Applicable	Yes
CW	33.20	10%	20%	3.32	6.64	1	1	1	0%	Yes	Yes						✓	along Beaverdam Run	021308050302	Beaverdam Run	Baltimore	No	Not Applicable	Yes
CX	36.42	5%	5%	1.82	1.82	1	1	0	0%	Yes	Yes			1			✓	along Beaverdam Run	021308050302	Beaverdam Run	Baltimore	m	Not Applicable	Yes
CY	12.51	15%	75%	1.88	9.38	1	1	0	0%	Yes	Yes						✓	along Beaverdam Run	021308050302	Beaverdam Run	Baltimore	Yes	Yes	Yes
CZ	4.08	5%	35%	0.20	1.43	1	1	0	0%	Yes	Yes						✓	along Beaverdam Run	021308050302	Beaverdam Run	Baltimore	Yes	Yes	Yes
DA	8.78	10%	20%	0.88	1.76	1	1	0	0%	Yes	Yes						X	along Sweathouse Branch	021308020296	Lowermost Big Gunpowder Falls	Baltimore	No	Not Applicable	Yes
DB	13.76	10%	30%	1.38	4.13	1	1	1	0%	Yes	Yes						✓	along Sweathouse Branch	021308020296	Lowermost Big Gunpowder Falls	Baltimore	No	Not Applicable	Yes
DC	6.00	10%	35%	0.60	2.10	1	1	1	0%	Yes	Yes						✓	along Sweathouse Branch	021308020296	Lowermost Big Gunpowder Falls	Baltimore	No	Not Applicable	Yes
DD	4.95	15%	15%	0.74	0.74	1	1	1	0%	Yes	Yes						✓	along Sweathouse Branch	021308020296	Lowermost Big Gunpowder Falls	Baltimore	Yes	Yes	Yes
DE	3.01	20%	40%	0.60	1.20	1	1	1	0%	Yes	Yes						✓	along Sawmill Branch	021308040299	Upper Little Gunpowder Falls	Baltimore	No	Not Applicable	Yes
DF	3.83	15%	10%	0.57	0.38	1	1	1	0%	Yes	Yes						✓	along Sawmill Branch	021308040299	Upper Little Gunpowder Falls	Baltimore	No	Not Applicable	Yes

		PERCENT OF ACRES PLANTABLE		PLANTABLE ACRES		PLANTABLE PRIORITY OR EXCLUSION AREAS 1=Yes 0=No				OWNERSHIP		RESPONDED TO LETTER AS INTERESTED IN TREE-PLANTING									PLANTABLE AREAS VERIFICATION		
MERLIN MAP	PARCEL ACRES	Riparian[1]	Upland[2]	Riparian[1]	Upland[2]	Riparian	Floodplain	Steep Slope	Percent Wetland - Plantable Area	Private Individuals	Primary Residence	By Phone	Via GVC Website	By Response Card	By Email	Other	Address Confirmed With Voter Data	STREAM	12-DIGIT WATERSHED	12-DIGIT WATERSHED NAME	COUNTY	Within View of Public Roads	Plantable Acres Verified From Nearby Roads	Plantable Acres Verified From 2023-24 Aerial Images
DG	68.78	5%	5%	3.44	3.44	1	1	1	0%	Yes	Yes			1			✓	along Parker Branch	021308040299	Upper Little Gunpowder Falls	Baltimore	No	Not Applicable	Yes
DH	7.09	0%	20%	0.00	1.42	1	1	1	0%	Yes	Yes						✓	along Thormton Branch	021308040299	Upper Little Gunpowder Falls	Harford	No	Not Applicable	Yes
DI	233.81	10%	2%	23.38	4.68	1	1	0	0%	Yes	Yes						X	along Yellow Branch	021308040299	Upper Little Gunpowder Falls	Harford	Yes	Yes	Yes
DJ	18.00	10%	5%	1.80	0.90	1	1	1	0%	Yes	No						✓	along Grave Run	021308060315	Grave Run	Baltimore	No	Not Applicable	Yes
DK	127.50	5%	5%	6.38	6.38	1	1	1	0%	Yes	Yes						✓	along Grave Run	021308060315	Grave Run	Baltimore	No	Not Applicable	Yes
DL	10.85	6%	7%	0.65	0.76	1	1	1	0%	Yes	No						X	along Grave Run	021308060315	Grave Run	Baltimore	Yes	Yes	Yes
DM	19.72	9%	2%	1.77	0.39	1	1	1	0%	Yes	Yes						✓	along Grave Run	021308060315	Grave Run	Baltimore	Yes	Yes	Yes
DN	3.66	15%	20%	0.55	0.73	1	1	1	0%	Yes	Yes						✓	along Grave Run	021308060315	Grave Run	Baltimore	No	Not Applicable	Yes
DO	8.00	10%	10%	0.80	0.80	1	1	1	0%	Yes	Yes						✓	along Indian Run	021308060315	Grave Run	Baltimore	Yes	Yes	Yes
DP	14.07	5%	25%	0.70	3.52	1	1	1	0%	Yes	Yes				1		✓	along Indian Run	021308060315	Grave Run	Carroll	Yes	Yes	Yes
DQ	40.74	15%	5%	6.11	2.04	1	1	1	0%	Yes	Yes						✓	along Walker Run	021308060316	Upper Big Gunpowder Falls	Baltimore	No	Not Applicable	Yes
DR	6.74	10%	2%	0.67	0.13	1	1	1	0%	Yes	No						✓	along Walker Run	021308060316	Upper Big Gunpowder Falls	Baltimore	No	Not Applicable	Yes
DS	37.83	3%	5%	1.13	1.89	1	1	1	0%	Yes	Yes						✓	along Walker Run	021308060316	Upper Big Gunpowder Falls	Baltimore	No	Not Applicable	Yes
DT	54.50	5%	3%	2.73	1.64	1	1	1	0%	Yes	Yes						✓	along Silver Run	021308060313	Prettyboy Reservoir	Baltimore	No	Not Applicable	Yes
DU	4.72	2%	85%	0.09	4.01	1	1	0	0%	Yes	Yes						X	along Windlass Run	021308030294	Bird River	Baltimore	Yes	Yes	Yes
DV	1.77	30%	30%	0.53	0.53	1	1	0	0%	Yes	Yes						X	along Windlass Run	021308030294	Bird River	Baltimore	Yes	Yes	Yes
DW	8.97	20%	40%	1.79	3.59	1	1	0	0%	No	No						✓	along Little Falls	021308050310	Little Falls - Owl Branch	Baltimore	Yes	Yes	Yes

		PERCENT OF ACRES PLANTABLE		PLANTABLE ACRES		PLANTABLE PRIORITY OR EXCLUSION AREAS 1=Yes 0=No				OWNERSHIP		RESPONDED TO LETTER AS INTERESTED IN TREE-PLANTING										PLANTABLE AREAS VERIFICATION		
MERLIN MAP	PARCEL ACRES	Riparian[1]	Upland[2]	Riparian[1]	Upland[2]	Riparian	Floodplain	Steep Slope	Percent Wetland - Plantable Area	Private Individuals	Primary Residence	By Phone	Via GVC Website	By Response Card	By Email	Other	Address Confirmed With Voter Data	STREAM	12-DIGIT WATERSHED	12-DIGIT WATERSHED NAME	COUNTY	Within View of Public Roads	Plantable Acres Verified From Nearby Roads	Plantable Acres Verified From 2023-24 Aerial Images
TOTALS	2,245.96			160.10	306.98	90	91	71				7	1	2	4	0								

FOOTNOTES

1. Riparian areas are within 100 feet of a stream, river or other waters.
2. Upland areas are more than 100 feet from a stream, river or other waters.

DATA SOURCES

MERLIN-Maryland's Environmental Resource & Land Information Network https://dnr.maryland.gov/Pages/Merlin.aspx

With the following layers turned on:

Parcel boundaries
Wetlands
12-Digit watersheds
NAIP Imagery 2018 set at 50% transparency

Added Data:

Plantable Area Analysis set at 25% transparency https://cicgis.org/portal/home/item.html?id=cdc704a8df7c4d0e963926332baab7f6
Maryland Forests - Forested Buffers set at 50% transparency - https://maryland.maps.arcgis.com/home/item.html?id=90241475bd9b451696670b1ad31beb8f
Property Ownership from State Department of Assessments & Taxation Real Property Records https://sdat.dat.maryland.gov/RealProperty/Pages/default.aspx

VERIFICATION

Field - Site was viewed from nearby roads to verify plantable areas remain present.
Aerial - Site was viewed with 2023-2024 Google Earth aerials to verify presence of plantable areas. MERLIN aerial dated from 2018.