Accelerating Non-Tidal Wetland Restoration Across the Bay Watershed: Documenting Landowners Views and Practitioner Needs Toward Identifying Solutions (PRELIMINARY DRAFT)

Work led by: The Nature Conservancy, Chesapeake Bay Program

Funded by: The Chesapeake Bay Trust

INTRODUCTION

Wetlands and other natural landscapes provide critical ecosystem services for the Chesapeake Bay watershed, including fish habitat, flood mitigation, and clean water. However, given the loss of historical wetlands across the region, these benefits have been significantly reduced (Dahl 1990).

Across the Chesapeake Bay Watershed, progress has been made toward restoring wetlands, but it has been slow, even compared to other conservation goals in the region. The wetland restoration goal is officially "off course" for the watershed, with only 5% of the 2025 acreage goal achieved between 2014-2022 (4,310 acres, not accounting for wetlands loss due to natural processes and development) (CBP, 2025).

Restoration programs—funded by federal, state or private entities—provide landowners incentives to restore land, but the decision to participate is ultimately voluntary (Reimer et al. 2014). Understanding landowner views on wetlands and restoration programs is therefore critical to addressing barriers to and motivations for participation.

But challenges and opportunities exist beyond landowner interest. Cultivating landowner interest through engagement takes capacity and skill on the ground, and the implementing of restoration programs even once a landowner is interested depends on program applications, permitting, design and construction, along with many other factors. Accelerating non-tidal wetland restoration across the watershed depends on not only understanding landowner views, but also the potential to increase the efficiency of the restoration process across the states.

This report documents opportunities and challenges to non-tidal restoration related to both landowner awareness and interest, but also the restoration implementation process in key watershed states. To address landowner interest, we conducted three surveys of landowners across key states within the Chesapeake Bay Watershed. The first survey,

conducted in 2022, focused on the Maryland and Delaware portions of Delmarva. The second and third surveys were done in 2024-2025 and focused on the watershed portions of Pennsylvania and Virginia. Across these regions, we surveyed landowners whose properties contained potentially restorable wetlands, based on spatial analyses (see Table 1).

Table 1: Responses to survey by state

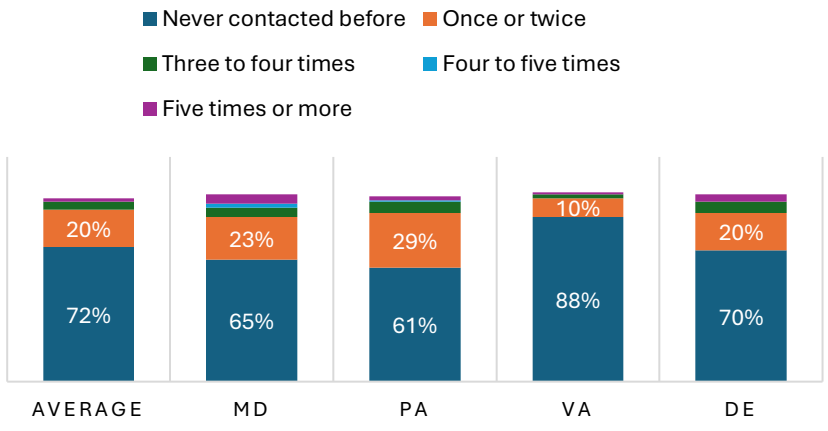
State	Number of Respondents	Response Rate	Average Acres Owned	Percent operating farms	Year Surveyed
DE	78	16%*	129	7%	2022
MD (Eastern Shore)	288		267	25%	2022
PA	655	20%	125	30%	2025
VA	600	17%	240	21%	2025
All	1621	18%	192	21%	2022-2025

* We use a combined response rate as a single survey was sent to both states.

Following surveys, we conducted workshops with restoration practitioners in each of our survey states (combining DE and MD). Workshops focused on describing survey results for that state and on understanding the challenges key practitioners face in accelerating restoration pace and scale in their state.

Below we report briefly on our survey results, followed by our findings from practitioner workshops.

FIGURE 1: MOST LANDOWNERS NEVER CONTACTED ABOUT RESTORATION OPPORTUNITY ON THEIR LANDS



SURVEY RESULTS

Landowner Interested in Wetlands and Restoration, Engagement Insufficient

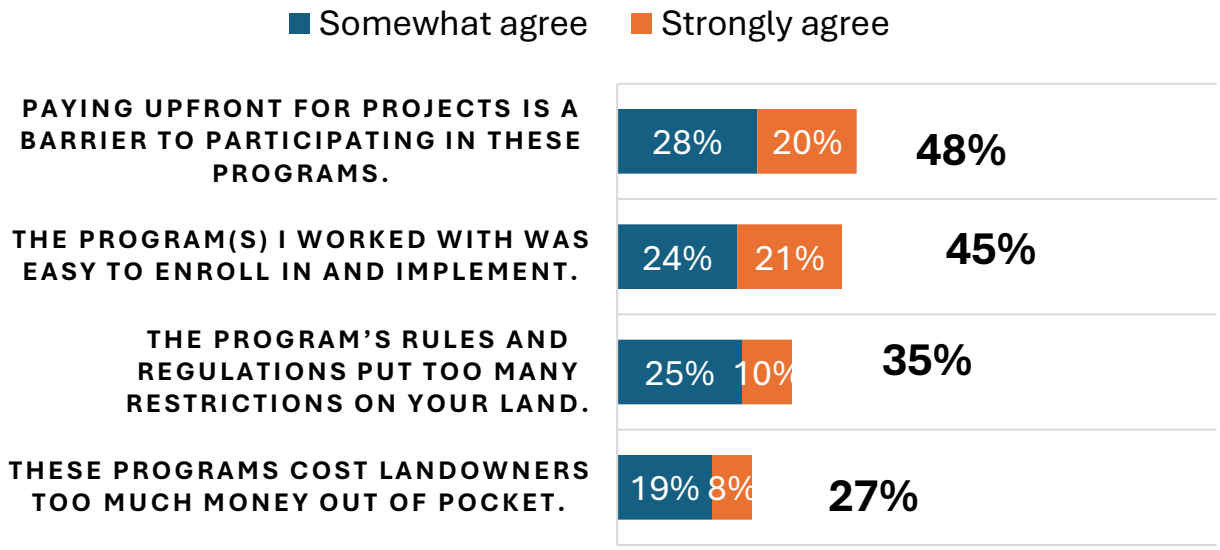
Our survey results clearly suggest that to date, landowner outreach has been insufficient across the watershed. ***On average, approximately 72% of surveyed***

landowners across the watershed have "Never been contacted before" about restoration programs their property might be eligible for. Lack of engagement is particularly pronounced in VA, where 88% of landowners reported never being contacted[1] (see Figure 1 for more detail).

In line with this result, a substantial portion of respondents in each state had "Never heard of" restoration or conservation programs offered by federal entities. ***On average, 54% of respondents had never heard of any of the federally supported restoration programs.***

We did explore how past participants in restoration programs—federal or otherwise—view those programs. These questions were only delivered to VA and PA survey respondents.

FIGURE 2: PAST ENROLLEE'S VIEWS OF PROGRAMS AVERAGE FOR PA AND VA

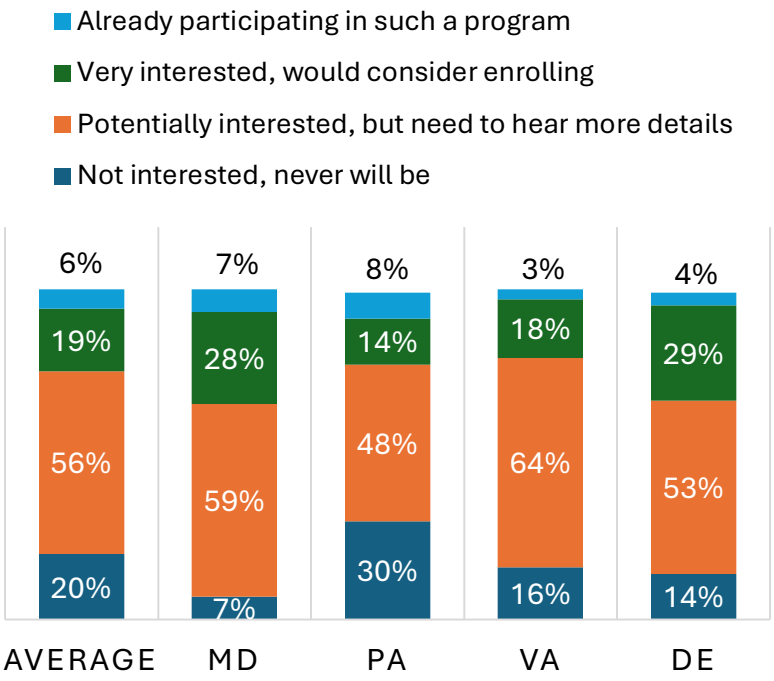


Looking across these respondents, **the most notable result is that 48% of past program participants in the two states somewhat or strongly agree that "paying upfront" is a barrier to participating in these programs (see Figure 2).**

[1] VA residents were also asked about their exposure to mitigation programs. Almost 91% of VA respondents reported also having never been contacted before about mitigation programs.

Despite our survey being the initial exposure to restoration program opportunity for the majority of respondents, initial interest in participation was high. When asked if they would consider enrolling a portion of their property into a restoration program, over half of respondents in each state were interested in learning more or actively considering enrolling (see Figure 3).

FIGURE 3: INTEREST IN PARTICIPATING IN RESTORATON PROGRAMS



Overall, respondents were "very motivated" to participate in restoration programs for the ecological benefits, but program incentives also matter. The top three "motivating" factors were: The opportunity to see more wildlife (42%); improving water quality (42%); and receiving payment for participating in the program (33%). These factors varied by state. See Figure 4 for more information.

When it comes to the benefits of wetland restoration specifically, a majority of respondents somewhat or strongly agreed that wetlands helped improve water quality (77%), protect wildlife (88%), and are beautiful (78%). Agreement on these varied, with PA residents being the least likely to agree that wetlands are beautiful (67% agreement) (see Figure 5). Notably, not all views were positive. A majority also felt that wetlands attracted pests and in PA, 67% of respondents felt wetlands "make farming harder" (asked only to PA and VA respondents).

Figure 4: Top 3 "very motivating" outcomes for restoration across surveyed states*

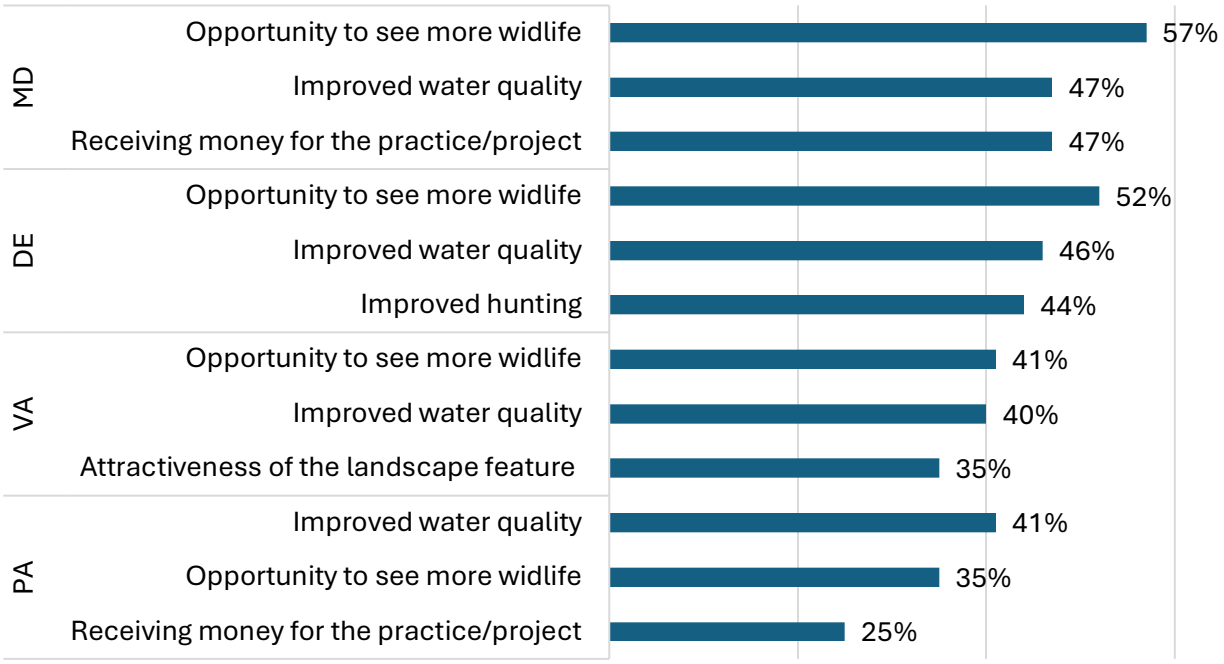
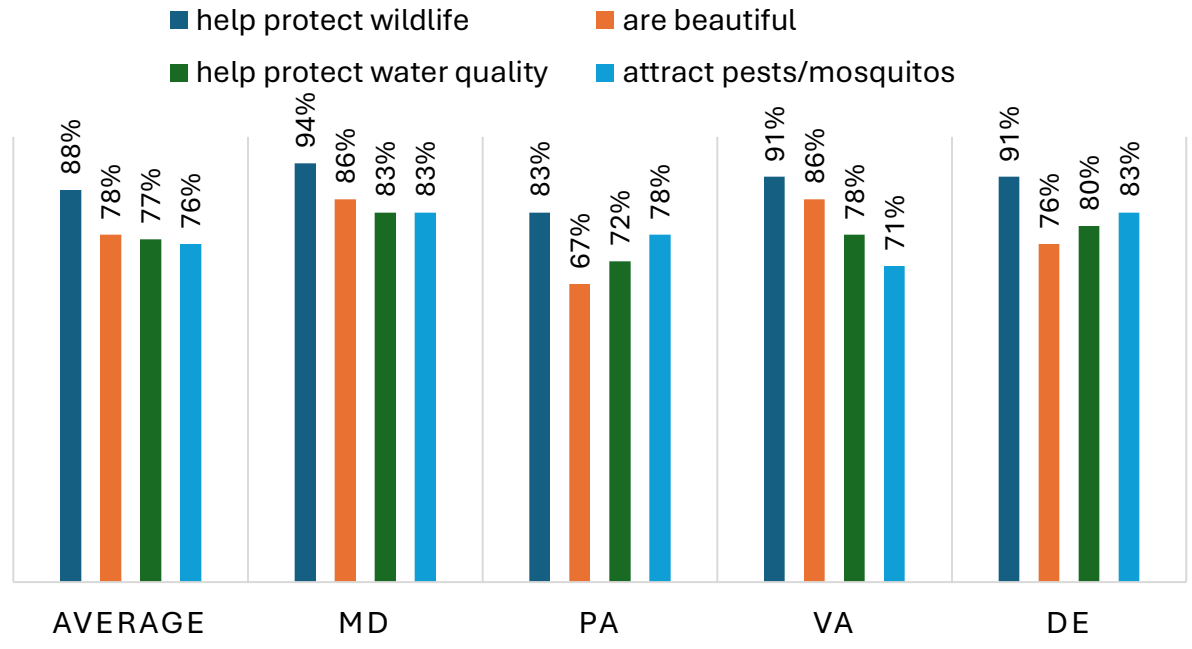


*Figure 4 note: *These findings exclude several questions that were directed only to VA and PA survey takers.*

FIGURE 5: RESPONDENTS WHO SOMEWHAT OR STRONGLY AGREE WETLANDS...



Engagement Potential Exists

Respondents were asked if they were interested in hearing more about the restoration potentials for their land, and if so, to provide contact information. ***Across our surveys, 62% of respondents said "yes" to being interested in outreach, equating to over 500 contacts throughout the watershed.*** In MD and DE, outreach to these landowners has also been completed. For VA and PA, engagement has only just begun and based on spatial analysis, these individuals conservatively represent at least 3,000 acres of wetland restoration opportunity alone—a number that approaches the total restored wetland acres between 2014-2022 (4,300).

PRACTITIONER WORKSHOPS

Exploring Opportunities and Challenges to Accelerating Restoration

Understanding practitioner response to these survey results—especially landowner interest—is critical to gaining insight into potential challenges or opportunities in stages of wetland restoration beyond landowners expressed interest. In the fall of 2025 (September – October), The Nature Conservancy's Chesapeake Bay Program convened three workshops with restoration practitioners in each of our survey areas (combining DE and the Eastern Shore of MD). Across each state, workshop participants represent federal[2], state, and county government departments, non-profit organizations, and private industry. In total, we engaged 38 external participants in these workshops and 16 distinct organizations (accounting for repetition across states).

The workshops included a short presentation of survey results, a facilitated discussion on the barriers practitioners have encountered when restoring wetlands in their state, and a brainstorming session for potential solutions. These workshops aimed to:

1. raise awareness of survey results in each of our survey states
2. identify barriers that could prevent restoration practitioners from meeting landowner demand suggested by the survey
3. develop a list of potential solutions to those barriers to engagement and implementation

After being shown data on survey respondents for their respective states, restoration practitioners did express enthusiasm about the amount of landowner interest. However,

[2] Federal partners were not present at the Virginia workshop, as it was held during the federal shutdown during 2025. Results from VA should be interpreted with this in mind.

most practitioners noted challenges that made it difficult/impossible to follow up on the landowner's interest. Out of the 11 Pennsylvania and Virginia organizations represented in these workshops, only one asked for the names of the landowners who responded to the survey so they could begin performing outreach.

Moreover, most practitioners we spoke with reported little to no capacity for proactive outreach on wetland restoration. They explained that they can only manage projects that come through existing networks or landowner inquiries—and even that is challenging due to limited staff capacity across agencies, slow project timelines, inconsistent regulatory standards, and time-intensive funding/program requirements. This indicates that, at least for now, landowner interest is not the primary barrier to accelerating wetland restoration across the Chesapeake Bay Watershed.

Insights into these barriers were compiled for this report. In Table 2, we categorized workshop-identified barriers to restoration by a thematic area (e.g. permitting). We note the specific implications for the work of the barrier, per workshop participant's insights. Workshop proposed solutions to each barrier are also presented in Table 2. Blank cells indicate that no recommendation was provided for the corresponding barrier during the workshops. These barriers represent the most geographically widespread issues (meaning they were noted by practitioners in at least 3 or our 4 survey states) limiting the pace and scale of wetland restoration across the Chesapeake Bay watershed.

Table 2: Watershed-wide Barriers, Their Implications, and Recommended Solutions

Area/Type	Noted barrier(s)	Implications	Recommended Solutions	States
Permitting	Limited state-level regulatory staff capacity	Causes delays in permitting process	Increase the staffing capacity of regulatory agencies to reduce review timelines.	VA, PA, DE
	Inconsistent state-level regulatory standards	Creates uncertainty about required permits and situations where regulators request modifications beyond their official scope	1) Create standardized permitting frameworks to reduce variability and streamline the review process across the state. 2) State government should initiate top-down communication to educate permitting staff about wetland restoration, provide guidance on permitting procedures, and signal that more restoration projects are expected.	VA, PA, DE
Capacity	Limited outreach capacity across agencies/organizations	Leads to reduced landowner awareness and fewer restoration opportunities		MD, DE, VA, PA

	Table 2 continued…			
	Limited NRCS Capacity to review and process WRE, EQIP and CREP applications	Results in delays or prevents landowners from submitting applications	1) Develop a Memorandum of Understanding (MOU) with state NRCS to support job approval authority and training for certification as technical service providers to enable non-federal actors to assist NRCS and expand program capacity. 2) Increase NRCS staff/NGO partner staff with the authority to move WRE applications through the NRCS ranking and approval process.	MD, DE, VA, PA
	Limited design capacity across agencies/organizations	Results in delayed restoration and less bandwidth for new projects	1) DU hire another engineer to increase capacity in DE, MD, VA	MD, DE, VA, PA
Funding Accessibility & Structure	Funding durations misaligned with project timelines	Makes funds difficult to use effectively	Improve grant programs to address short funding durations and streamline grant administration	MD, DE, VA, PA
	Project maintenance and monitoring required but not funded	Implemented projects more likely to go unmaintained and restoration work at risk of being lost; can discourage willingness to take on new/more projects	Create grant program(s) to support maintenance and management of restored wetlands.	DE, VA, PA

Table 3 focuses on *state-specific* barriers (those reported in 1 or 2 of the 4 surveyed states). Like Table 2, it provides the area that the noted barriers fall within, their implications for limiting the pace and/or scale of wetland restoration, and the solutions to these issues that workshop participants noted. Blank cells indicate that no recommendation was provided for the corresponding barrier during the workshops. While these barriers are less geographically common in the watershed, that should not be seen to suggest they are less important in the specific states where they are present. ***We synthesize these results—across surveys and practitioner workshops—in state specific recommendations in Appendix A.***

Table 3: State-Specific Barriers, Implications, and Recommended Solutions				
Barrier area	**Noted barrier(s)**	**Implications**	**Recommended Solutions**	**States**
Permitting	High permitting costs	Disincentivizes landowner participation or necessitates supplemental funding	Create an agriculture land permitting exception for the construction/restoration of wetlands.	VA, PA
Capacity	Lack of cross organizational partnerships and communication pathways	Limits ability to pass on potential projects and share workload	1) Create grant program(s) to support partnership development and initial project funding in order to catalyze partnership efforts 2) Develop a Memorandum of Understanding (MOU) with state NRCS to support job approval authority and training for certification as technical service providers to enable non-federal actors to assist NRCS and expand program capacity.	VA, PA
	Existing federal and state capacity has limited knowledge of wetland restoration and funding programs (e.g., SWCD staff)	Results in delayed restoration timelines and limits outreach	Targeted education campaigns for practitioners and government staff to improve understanding of wetland restoration processes.	VA
Funding Accessibility & Structure	Use of Farm Bill funding requires IRS Annual Gross Income Review which is extending past application review window	Causes landowner applications to be deferred until following year		MD DE
	NRCS's Wetland Reserve Easement appraisal process extending past application review window	Causes landowner applications to be deferred until following year	Change the federal Geographic Area Rate Cap (GARC) process toward reducing the challenges associated with contract creation. The GARC process could be supported by eliminating the lower acreage limitations to avoid unnecessary delays in property appraisals.	MD, DE
	Federal grant programs require the solicitation of multiple bids to proceed with construction of projects	Slows down restoration process and dampens the potential for cross-organization partnerships		VA, PA

	Table 3 continued…			
	Funding rates (e.g., from grants) does not align with project cost	Necessitates piecing together various funding streams for one project	Improve funding programs to expand support for design, permitting, and construction	PA
	State funding sources do not include incentives for landowners	Fewer landowners pursue restoration opportunities	Modify funding programs to support cost-share for non-tidal wetland restoration on agricultural lands.	VA
	Lack of state-prioritized funding for non-tidal wetland restoration	Less funds available		VA

To accelerate restoration and meet Chesapeake Bay wetland goals, addressing barriers that extend project timelines and free up/build capacity for proactive outreach to interested landowners is critical. While no single barrier stands out as the primary challenge, practitioners were especially optimistic about addressing permitting issues to shorten project timelines and establishing partnerships or Memorandums of Understanding (MOUs) with other agencies to improve communication and expand capacity. Working through existing funding was also a notable challenge and given financial concern across the Bay states, there is a recognized need to pursue innovative funding mechanisms by leveraging public and private partnerships.

With these barriers and recommendations identified, the next step is to meet with policy staff[3] across the watershed to understand which problems have the most scalable impact and are the most feasible to resolve.

[3] Outcomes of policy workshop will be included in final report.

Report Information

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References:

1. Dahl , T.E. 1990. Wetland Losses in the United States 1780's TO 1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington. D.C. 13pp.
2. [CBP] Chesapeake Bay Program (2025). Wetlands. Chesapeake Bay Progress. Available at: https://www.chesapeakeprogress.com/abundant-life/wetlands#:~:text=Recent%20Progress%3A%20Increase,restored%20acres%20on%20agricultural%20lands
3. Reimer, A. P., & Prokopy, L. S. (2014). Farmer participation in US Farm Bill conservation programs. *Environmental management*, *53*(2), 318-332.

Appendix A: State Specific Recommendations

Pathways to increase wetland restoration in Delaware:

1. **Increase landowner outreach and engagement (based on low past exposure; survey results)**
2. **Revise and socialize wetland permitting process**
   - Standardized permitting across state's counties and initiate state/county communication/education with permitting staff
   - To reduce cost and review timeline of permits, create agriculture land exception for wetland restoration and add permit review staff (especially related to cultural review)
3. **Address restoration capacity issues**
   - Support cross-organizational partnership development through funding and/or MOUs w/ NRCS increase capacity of state and non-profit staff to work through NRCS programs
   - Support additional wetland design and outreach capacity (non-profit)
4. **Redevelop Funding Models**
   - Expand funding timelines to match pace of wetland restoration projects (5 years from outreach to completion)
   - Reduce the organizational cost of project maintenance and monitoring
   - Eliminate lower acreage limits in the NRCS Geographic Area Rate Cap (GARC) process to avoid unnecessary delays in property appraisals for farm bill programs

Pathways to increase wetland restoration in Virginia:

1. **Increase landowner outreach and engagement** (based on low past exposure; survey results)
2. **Develop a program that minimizes participant's upfront costs for restoration programs** (based on survey results)
3. **Revise and socialize wetland permitting process**
   - Standardized permitting and reduce cost of permits
   - Educate state/county permitting staff on wetland restoration projects/permitting
   - Create agriculture land exception for wetland restoration and/or add permitting review staff
4. **Address restoration capacity issues**
   1. Support cross-organizational partnership development through funding and/or MOUs w/ NRCS increase capacity of state and non-profit staff to work through NRCS programs
   2. Support additional wetland design and outreach capacity (non-profit)
5. **Redevelop Funding Models**
   1. Expand funding timelines to match pace of wetland restoration projects (5 years from outreach to completion)
   2. Reduce the cost of project maintenance and monitoring
   3. Develop state program for non-tidal restoration, and includes landowner incentives
   4. Adjust EQIP cost-share rates to align with expenses on Eastern Shore

Pathways to increase wetland restoration in Maryland:

1. **Increase landowner outreach and engagement (based on low past exposure; survey results)**
2. **Address restoration capacity issues**
   1. Support cross-organizational partnership development through funding and/or MOUs w/ NRCS increase capacity of state and non-profit staff to work through NRCS programs
   2. Support additional wetland design and outreach capacity (non-profit)
3. **Redevelop Funding Models**
   - Expand funding timelines to match pace of wetland restoration projects (5 years from outreach to completion)
   - Eliminate lower acreage limits in the NRCS Geographic Area Rate Cap (GARC) process to avoid unnecessary delays in property appraisals for farm bill programs

Pathways to increase wetland restoration in Pennsylvania:

1. **Increase landowner outreach and engagement (based on low past exposure; survey results)**
    1. Address landowner perception of wetlands (based on low past exposure; survey results)
2. **Develop a program that minimizes participant's upfront costs for restoration programs (based on survey results)**
3. **Revise wetland permitting process**
    - Standardized permitting across state's counties
    - To reduce cost and review timeline of permits, create agriculture land exception for wetland restoration and add permit review staff
4. **Address restoration capacity issues**
    1. Support cross-organizational partnership development through funding and/or MOUs w/ NRCS increase capacity of state and non-profit staff to work through NRCS programs
    2. Support additional wetland design and outreach capacity (non-profit)
5. **Redevelop Funding Models**
    - Expand funding timelines to match pace of wetland restoration projects (5 years from outreach to completion)
    - Reduce the organizational cost of project maintenance and monitoring
    - Develop fundings programs that better align with project costs (especially related to legacy sediment)