



Evaluation of the Chesapeake Bay Stewardship Fund's Innovative Nutrient and Sediment Reduction (INSR) Program

FINAL EVALUATION REPORT AND APPENDICES

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EXECUTIVE SUMMARY

The Chesapeake Bay is impaired due to decades of harmful impacts from agricultural, urban, and suburban activities on the landscape. Disproportionate nutrient and sediment loads and other detrimental effects from chemical pollution have degraded the Bay's waters, threatening key indicator species, such as oysters and blue crabs, as well as important habitats.

Since 1999, the United States Environmental Protection Agency (EPA) and the Chesapeake Bay Program have engaged the National Fish and Wildlife Foundation (NFWF) to help accelerate local restoration actions and spur innovation in watershed restoration. As part of NFWF's Chesapeake Bay Stewardship Fund (CBSF) grantmaking portfolio,¹ NFWF's Innovative Nutrient and Sediment Reduction (INSR) Program contributes to the federal-state Chesapeake Bay Program partnership's Total Maximum Daily Load (TMDL) goal of restoring habitats and water quality by 2025. Goals include reductions for nitrogen (N), phosphorus (P), and sediment of 25%, 24%, and 20% respectively.²

Since 2009, the INSR program has allocated between \$4 to 8 million per year in project funding to a variety of local partners across the Chesapeake Bay watershed to specifically address two of the most outstanding challenges to Bay restoration: agricultural nutrient management and stormwater runoff. During that time, NFWF has funded 118 INSR projects that have implemented best management practices (BMPs) on nearly 180,000 acres of land and 222 miles of stream, and fostered innovative approaches to nutrient and sediment reduction in targeted and other areas throughout the Chesapeake Bay watershed.³ INSR innovations include a mix of sustainable improvements in removal efficiencies and/or cost-effectiveness of established BMPs approved by the Bay partnership, as well as projects seeking to test wholly new technologies or approaches that have not yet been proven, but which show reason for promise and potential success. INSR supports a wide variety of organizations working on Bay restoration in their efforts to develop and implement innovative, cost-effective BMPs and actively disseminate experiences throughout the watershed.

Evaluation Findings-in-Brief

The INSR program has achieved water quality benefits for the Chesapeake Bay. Estimated (modeled) reductions⁴ for a subset of completed INSR projects implemented between 2009 – 2012 were: nitrogen, 370,000 lbs.; phosphorus, 15,000 lbs., and sediment, 16,000,000 lbs. When compared to estimated reductions across the Bay partnership over the same time, these reductions represent 2.4%, 1.2%, and 3.7% of overall estimated reductions between 2009-2012.

¹ Includes the NFWF Small Watershed Grants program and the INSR program.

² Chesapeake Bay Total Maximum Daily Load (TMDL) Document. 2010. Available at: <https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-document>

³ Grant years 2009-2015.

⁴ Here and throughout, modeled reductions are referred to as 'estimated reductions,' as opposed to 'actual reductions,' which would rely on water quality monitoring data that were not available in sufficient quantity for this evaluation.

In terms of estimated contributions toward the 2025 Bay-Wide TMDL goal, these figures represent reduction contributions of 0.54% for nitrogen, 0.31% for phosphorus, and 1.21% for sediment.⁵ Based on analysis conducted by the Chesapeake Bay Program Office (O. Devereux and J. Sweeny) using the CAST tool, estimated total cost for reported implementation Bay-wide between the four years 2009-2013 was estimated at \$1 billion (\$1.064B). NFWF's investment towards the 34 projects modeled was approximately \$16 million, with an additional \$24 million in matching dollars, for a total of \$40 million. While these figures give a sense of the comparative magnitude of spending, they are not directly comparable.⁶

While these reductions are still a small portion of total loads to the Bay, they represent just the subset (~30%) of INSR projects that had been fully implemented at the time of this evaluation. Nevertheless, they demonstrate that innovative approaches are contributing to water quality improvements.

Estimated load reductions were highest for INSR-funded agricultural practices

Cover crops, nutrient management, and conservation tillage (e.g., leaving crop residue such as corn stalks on fields to reduce soil erosion) were the leading BMPs in INSR projects yielding the highest average estimated nitrogen reductions. Stream restoration and nutrient management accounted for highest average estimated phosphorus reductions as well as cover crops and conservation planning.⁷ Projects with the highest average sediment reductions utilized cover crops, stream restoration, conservation tillage, and conservation planning. Practices accounting for the greatest loads across N, P, and sediment were: conservation planning, conservation tillage, pasture management, and cover crops. Agricultural practices generally contributed the highest estimated load reductions while urban practices generally contributed lower estimated reductions since baseline nutrient and sediment loads are generally higher in agricultural settings. However, bioretention and pervious pavement yielded notable phosphorus reductions in some places.

Estimated and actual load reductions are highly dependent on local environmental factors and can yield higher or lower estimated load reductions under different circumstances and/or locations. BMPs are best considered in their implementation- and location-specific contexts to best understand how these activities may have contributed to estimated nutrient and sediment reductions. Further, standardized load estimation and reporting tools are not used consistently in the watershed, making comparisons difficult. Use of standardized load estimation and reporting tools is warranted.

⁵ Estimated load reductions (nitrogen, 370,000 lbs.; phosphorus, 15,000 lbs.; sediment, 16,000,000 lbs.) can also be compared to a No Action (pre-BMP) baseline, which yields estimated reductions of 0.70% nitrogen, 0.55% phosphorus, and 0.79% sediment loads to the Bay for the modeled INSR projects.

⁶ These figures include both costs of implementation to achieve water quality improvements as well as outreach and dissemination to foster further adoption. Since CAST estimated total costs and NFWF's investment cost for modeled projects are calculated differently (e.g., CAST estimates do not include outreach/dissemination, but do include other factors), we cannot relate NFWF investments to overall costs directly.

⁷ Conservation planning is included as an estimable BMP in the BayFAST model, which incorporates assumptions and inputs (e.g., acreage and location-specific parameters).

Innovation: INSR approaches are demonstrating effectiveness and transferability with more to be learned

Novel, previously-untested approaches were roughly on par with new applications utilizing more established Bay watershed practices in terms of overall effectiveness, with both groups finding good success in many cases, both technically and in terms of cost-effectiveness. Valuable lessons continue to be learned by all. Since survey results found that evidence of both technical and cost-effectiveness are key drivers for adoption, these factors are important in understanding what is working across the Bay watershed, along with how transferability – how feasible it is or may be to widely apply the technology or approach to achieve nutrient and sediment reductions elsewhere in the watershed. Among agricultural innovations, development of a nutrient credit trading program ranked highly across indicators for both effectiveness as well as innovation, with on-farm community based composting also ranking highly. Low impact development technological enhancements, increased coordination among local governments, and turf to tree conversion have been some of the most successful stormwater and habitat innovations holding promise for widespread adoption.

Clustering projects has fostered adoption of INSR approaches by others

Nearly all (95%) of INSR approaches have been adopted by others in the Bay watershed, with 568 total reported instances of adopted INSR approaches. Evidence of technical- and cost-effectiveness are the primary drivers for adoption.⁸ INSR practices adopted by Bay partner organizations are widely distributed across the Bay watershed with clusters of adopted practices occurring in the areas of Lancaster, PA, Shenandoah Valley, VA, and the Washington DC region where INSR-supported information-sharing has also focused. Most adopters (82%) have fully implemented and/or sustained their adopted INSR approach. Examples of some of the INSR approaches most-adopted in the Bay watershed include: use of natural stream restoration methods for sediment reduction; local, cross-sector water quality nutrient trading; and innovative, low-impact design and stormwater retrofits. Methodological and scientific factors preclude a determination of any synergistic effects or other effects on water quality from clustering projects in targeted subwatersheds or other geographic locations.

Information sharing in the Chesapeake Bay watershed facilitated adoption of INSR approaches

INSR grantees and other Bay partners value training workshops, conferences, and informal communication to share and learn about innovative approaches. Grantees reported learning of other INSR-funded practices at Bay networking forums and then tailoring and adopting them to meet the needs of their site-specific contexts. In addition to workshops and conferences, many Bay partners highly value informal conversations with those they trust and respect, such as soil

⁸ These terms were not pre-defined for survey or interview respondents, but can generally be interpreted as follows: Technical-effectiveness: Achievement of intended or desired result. Cost-effectiveness: Achievement of intended or desired result considering associated costs.

conservation staff and non-profit technical assistance providers, when seeking information on BMP effectiveness and implementation. In particular, farmers prefer learning about innovative approaches from other farmers they respect as agricultural practice leaders.

Recommendations for INSR grant making based on water quality outcomes and clustering in targeted subwatersheds

1. Carefully consider multiple program goals in grantmaking and project siting

The INSR program should balance goals for water quality improvement with its goals to identify and disseminate innovative, yet unproven, approaches with potential for success. Innovation takes different forms to achieve various ends, including experimenting with new technologies, building new partnerships and governance structures, integrating knowledge into policy making, and incorporating systems-level approaches. Meaningful results from innovation may also emerge over time. INSR program goals include fostering advancement of new technologies or approaches as well as identifying what is effective for nutrient and sediment reduction. NFWF should continue to support novel innovative practices and approaches with the understanding that although some will find less immediate success, over time, the program can foster the spread of those that effectively lead to water quality improvement.

2. Coordinate standardized collection of project information to better standardize estimated load reductions across the watershed and facilitate grantmaking decisions

Load reductions expected to result from implementation of different sets of BMPs are complex and depend on factors including baseline nutrient and sediment loading available for reduction; type of land use in watershed, which affects both baseline loading amount and types of BMPs able to be implemented; and the spatial location of a watershed, which affects soil types, layout of hydrology, hydrologic connection to Chesapeake Bay, and other factors.

To better compare potential load reductions across potential or already-funded INSR projects, a consistent, geographically explicit modeling and reporting tool should be used by NFWF and its grantee community.

3. Consider proximity to existing water quality monitoring locations to better compare modeled load reduction estimates as part of grant making decisions

When possible, NFWF could consider coordinating grant locations with locations of existing water quality monitoring data to obtain real-world field estimates of load reductions to compare to modeled reductions. Proposed projects could be triaged based on factors that would lead to greatest load reductions (e.g., magnitude of baseline nutrient and sediment loads).

Recommendations for sharing information about nutrient and sediment reduction innovations and encouraging adoption

4. Continue to cluster projects to foster further adoption in priority areas

Since adopters reported learning about nutrient and sediment reduction approaches often informally through organizations and individuals they know and respect (e.g., local leaders in farming practices), a localized context for information sharing is indicated, lending support to continued project clustering to facilitate focused and sustained dissemination efforts in priority areas. Continue to develop, leverage, and support partnerships to facilitate dissemination and adoption of effective and innovative practices.

5. Continue to develop, leverage, and support partnerships to facilitate dissemination and adoption of effective and innovative practices

NFWF should continue to build and grow partnerships with organizations that are considered well connected, trustworthy, and knowledgeable by Bay stakeholders such as soil conservation districts, university extensions, non-profit technical assistant organizations, local/municipal governments, and local non-profits.

6. Further engage the Bay Community by expanding Forum opportunities

Because adopters, potential adopters, and intermediaries stated that they attend professional conferences to learn about innovative practices as part of their profession, expanding attendance at Forums would connect NFWF to a broader base of Bay programs with an interest in innovative practices.

7. Continue to provide or support the development of materials that further the dissemination of INSR approaches

NFWF should continue to actively provide guidance and support to grantees on the development of content and materials that would help them share their approach with other Bay programs in the watershed. This could include more information (e.g., via fact sheets or case studies) on cost and cost-effectiveness to aid in decisions about adoption. This could also include providing additional funding or guidance on how to develop how-to manuals or guides that could be disseminated to other practitioners; how to provide effective trainings; and presentations or posters at professional conferences. Once programs develop these materials, NFWF should also provide opportunities to share them with the broader Bay community.

8. Continue to support networking activities that maximize informal communication as a means of sharing information

Engage locally-based organizations who are aware of and have established relationships with the well-respected thought leaders in the community so that NFWF has a direct line of communication to those leaders as needed. This could help NFWF share successful INSR approaches that could then be further disseminated to the community.

EVALUATION PURPOSE AND METHODS

This third-party evaluation for the National Fish and Wildlife Foundation's Chesapeake Bay Stewardship Fund's Innovative Nutrient and Sediment Reduction (INSR) program focuses on the 118 INSR grants funded by NFWF between 2009 and 2015, with specific focus for water quality modeling purposes on 50 out of those 118 that were completed by early 2016.⁹ These 50 grants were made between 2009 and 2012 and represent the implemented INSR-funded practices and approaches for which NFWF had complete information in the form of final reporting data at the time evaluation commenced.

Evaluation Purpose

The overarching purpose of the INSR evaluation was to understand:

- What water quality improvements have been made in terms of estimated nutrient and sediment load reductions based on modeled data;
- Which practices have been most effective at reducing nutrient and sediment pollution, and which have been most innovative;
- What effect clustering of INSR projects in targeted areas has had, both on estimated load reductions and dissemination and adoption of INSR practices;
- How information about INSR practices and approaches has been shared with the broader Chesapeake Bay community; and
- To what extent INSR practices and approaches have been adopted by others in the Bay watershed.

The specific questions the evaluation team responded to are included in Appendix A.

Evaluation Methods

A utilization-focused approach guided our mixed-methods study. This approach engaged program staff to ensure that evaluation findings will be useful for future program planning, improvement, and decision making (Patton, 2008). Findings presented here are based on an integrated qualitative and quantitative analysis of water quality modeling activities, two online surveys, and interviews with INSR grantees as well as other Bay watershed partners.¹⁰ The evaluation team presented modeling results to a panel of three experts external to the evaluation team for further review and consideration of appropriate applications of the results in the context of the INSR program. INSR grantee documents, including project proposals and final reports were also reviewed as part of these activities. Appendices B – G provide additional details on data sources, data analysis, results, and study limitations.

⁹ Closed out with final reports received by NFWF.

¹⁰ Herein reference to Bay 'partners' refers generally to those organizations and/or individuals who are involved or could potentially be involved in Bay conservation/restoration activities, including INSR grantees, unless otherwise delineated. In this evaluation, other Bay partners are also referred to as 'other watershed groups.'

BACKGROUND

INSR Program Context

The Chesapeake Bay is impaired due to decades of harmful impacts from agricultural, urban, and suburban activities on the landscape. Disproportionate nutrient and sediment loads and other detrimental effects from chemical pollution have degraded the Bay's waters, threatening key indicator species, such as oysters and blue crabs, as well as important habitats. Efforts at federal, state, local, and regional levels to restore the Bay reach far and wide across the six states and District of Columbia that together make up the Bay watershed. For the first time in its 18 years of tracking Bay restoration progress, the Chesapeake Bay Foundation (CBF) in its *2016 State of the Bay* report rated the Bay with its highest score to date: a C-, putting the Bay on a slow trajectory toward recovery (CBF, 2016). Efforts such as NFWF's INSR program are working to achieve water quality benefits for the Bay, but there is more to do.

Since 1999, US EPA and the Chesapeake Bay Program has engaged NFWF to accelerate local restoration actions and spur innovation in watershed restoration. As part of NFWF's Chesapeake Bay Stewardship Fund (CBSF) grantmaking portfolio,¹¹ NFWF's INSR Program contributes to the federal-state Chesapeake Bay Program partnership's TMDL goal of restoring habitats and water quality by 2025. Goals include reductions for nitrogen, phosphorus, and sediment of 25%, 24%, and 20% respectively.¹²

Since 2009, the INSR program has allocated between \$4 to 8 million per year in project funding to a variety of local partners across the Chesapeake Bay watershed to specifically address two of the most outstanding challenges to Bay restoration, agricultural nutrient management and stormwater runoff. During that time, NFWF has funded 118 INSR projects that have implemented BMPs on nearly 180,000 acres of land and 222 miles of stream, and fostered innovative approaches to nutrient and sediment reduction in targeted and other areas throughout the Chesapeake Bay watershed.¹³ INSR innovations include a mix of new approaches utilizing established BMPs approved by the Bay partnership as well as projects seeking to test wholly new technologies or approaches that have not yet been proven, but which show reason for promise and potential success. INSR supports a wide variety of organizations working on Bay restoration in their efforts to develop and implement innovative, cost-effective BMPs and actively disseminate experiences throughout the watershed.

The underlying premise for this effort is that true improvements in water quality may only be realized through the development, dissemination, and replication of sustainable approaches to nutrient and sediment reduction by local partners around the Bay. While projects funded under this program have direct benefits measured in reduced nutrient and sediment inputs, a major

¹¹ Includes the NFWF Small Watershed Grants program and the INSR program.

¹² Chesapeake Bay Total Maximum Daily Load (TMDL) Document, Available at: <https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-document>

¹³ Grant years 2009-2015.

program impact is achieved through identification and replication of best practices beyond those funded directly through the program.

INSR Projects by Geography and Sector

The INSR program's 118 funded projects between 2009 and 2015, were categorized into 30 innovations (Table 1) and several main groups for purposes of this evaluation, including: agricultural, stormwater, habitat restoration, multi-sector, and other (e.g., planning, septic system and oyster restoration projects) (Figure 1).

INSR grant making has focused its support on projects applying nutrient and sediment practices and approaches in new and innovative ways. Such innovations may take the form of applying proven BMPs in new combinations, contexts, or locations. For example, projects applying combinations of BMPs in multiple sites may require new kinds of partnerships spanning beyond localities to larger subwatersheds, such as the Conewago Creek Initiative which is connecting groups throughout the Lower Susquehanna region. Coordination and implementation of new combinations of BMPs across agricultural and urban landscapes are taking place, such as integrated efforts to encourage increased adoption of conservation planning in agricultural areas, such as the Shenandoah Valley of Virginia, and increasing awareness and adoption of natural stream restoration techniques for stormwater management by local jurisdictions in the Chemung River watershed, New York.

TABLE 1. INSR-funded innovations by sector

Sector	INSR-Funded Innovations
Agriculture	<ol style="list-style-type: none"> 1. Continuous improvement plans to promote regulatory compliance and increasing farm-scale nutrient balance over time 2. Farmer-to-farmer mentor programs to increase agricultural BMP adoption 3. Increasing agricultural BMP adoption/implementation by connecting water quality improvements to food system sustainability and supply chains 4. Increasing agricultural BMP adoption/implementation by engaging absentee landowners and embedding agricultural BMPs into conservation easements 5. Increasing BMP adoption by promoting benefits to recreationally-important species 6. Multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems 7. New combinations of new and existing programs to increase conservation on Plain Sect farms 8. Use of adaptive management tools to improve land retirement programs 9. Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes 10. Use of innovative technologies to manage excess manure nutrients and/or ammonia emissions from animal production 11. Use of novel manure injection technologies for subsurface application of dry poultry and/or dairy manures
Urban/ Stormwater	<ol style="list-style-type: none"> 12. Stormwater management using watershed scale approaches and/or increased coordination among local governments 13. Demonstrate the use of regenerative stormwater conveyance systems 14. Expand the capacity of local governments to finance stormwater improvements through public and private funding 15. Identifying and addressing barriers to stormwater BMP implementation 16. Implementation of intensive training program for stormwater design professionals and local government planners 17. Increase residential GI adoption using outreach, stormwater audits, and financial incentive programs 18. Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits 19. Non-traditional partnerships for stormwater management and green infrastructure 20. Use of Floating Treatment Wetlands as a wetland retrofit 21. Use of subsoiling, sand filters and soil media additives, and biochar to increase performance of stormwater management facilities 22. Use of treatment trains to manage flow and quality of stormwater runoff
Habitat Restoration and Forest	<ol style="list-style-type: none"> 23. Converting turf to trees 24. Restoration of oyster reefs and measurement of associated nutrient assimilation capacity 25. Train volunteer watershed experts in community nutrient and sediment reduction activities 26. Use of alternatives planting methods and/or volunteers to improve establishment and maintenance of riparian forest buffers 27. Use of decision support, targeting tools, and flexible stands to increase adoption and maximize benefits of forest buffer and riparian restoration
Multi-sector	<ol style="list-style-type: none"> 28. Community-based approaches for nutrient reduction 29. Market-based trading programs for increased agricultural conservation and stormwater management 30. Watershed-scale effort involving coordination across multiple sectors (i.e., including agricultural and non-agricultural partners)

All INSR Projects by Sector in the Chesapeake Bay Watershed (n=118)

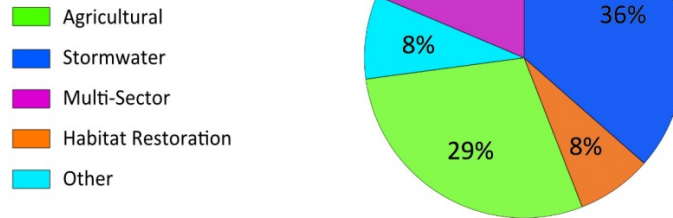


FIGURE 1. All INSR projects by sector in the Chesapeake Bay watershed (n=118)

While most projects were focused within Maryland, Pennsylvania, or Virginia, roughly 15% of INSR projects involve multiple states across the watershed (Figure 2).

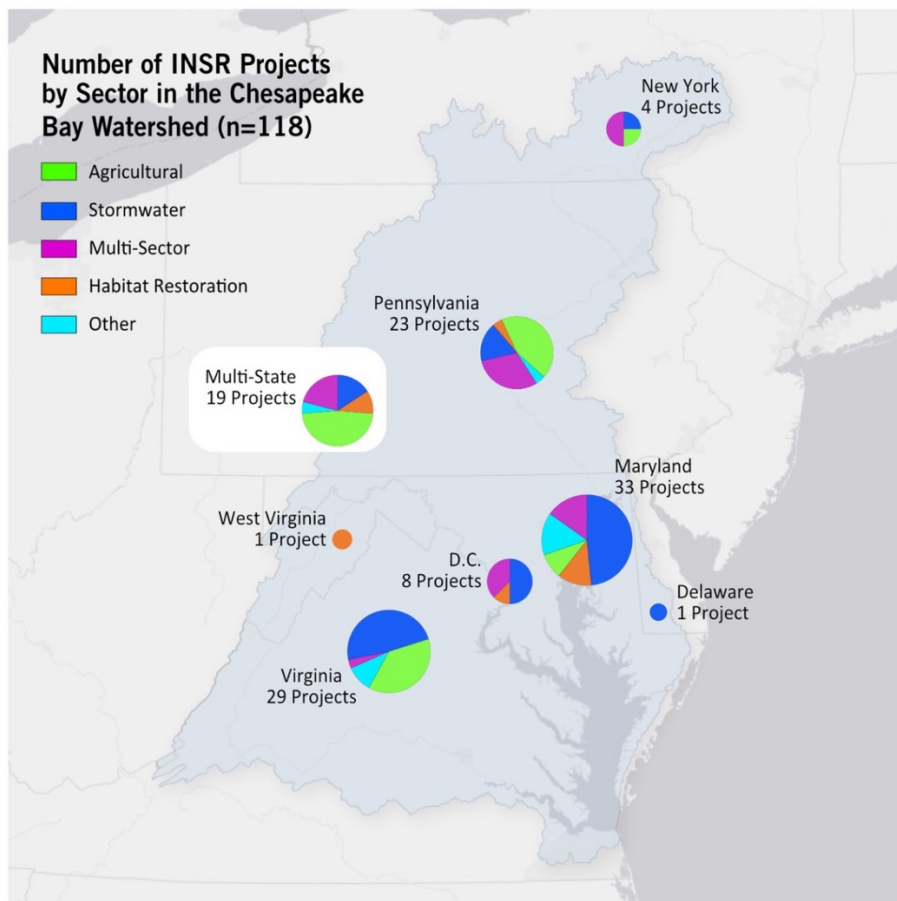


FIGURE 2. Number of INSR projects by sector in the Chesapeake Bay watershed (n=118)

EVALUATION FINDINGS

Estimated load reductions from water quality modeling were highest for INSR-funded agricultural practices

- **Estimated load reductions from modeled INSR projects across 220 subwatersheds¹⁴ were approximately 370,000 lbs. nitrogen, 15,000 lbs. phosphorus, and 16,000,000 lbs. sediment, accounting for 2.4%, 1.2%, and 3.7% of total estimated reductions by Bay partners between 2009 and 2012, respectively.**
- **Modeled subwatersheds (HUC12) with the highest estimated load reductions (lbs.) included INSR-funded projects in which the following practices were dominant:**
 - **Conservation planning, cover crops, nutrient management, and pasture management (nitrogen reduction)**
 - **Conservation planning, nutrient management, and pasture management (phosphorus reduction)**
 - **Conservation planning, conservation tillage, and pasture management (sediment reduction)**
 - **Conservation planning, conservation tillage, cover crops, and pasture management (highest reductions across N, P, and sediment)**
- **Urban practices generally contributed lower estimated reductions, though bioretention and pervious pavement yielded notable phosphorus reductions in some places.**
- **Local water quality trading, and on-farm community composting were two of the most innovative INSR agricultural approaches. Newer, more experimental technologies, had good success with low impact development technological enhancements and the application of agricultural subsoiling and soil amendment practices to urban soils.**

Impacts of INSR projects on nutrient and sediment reduction: Modeling results and implications for the program

The INSR program has achieved water quality benefits for the Chesapeake Bay. Estimated (modeled) reductions¹⁵ for a subset of completed INSR projects implemented between 2009 and 2012 were: nitrogen, 370,000 lbs.; phosphorus, 15,000 lbs., and sediment, 16,000,000 lbs. When compared to estimated reductions across the Bay partnership over the same time, these reductions represent 2.4%, 1.2%, and 3.7% of overall estimated reductions between 2009 and

¹⁴ A total of 34 INSR projects were modeled, representing 29% of the 118 INSR projects included in this evaluation.

¹⁵ Here and throughout, modeled reductions are referred to as 'estimated reductions,' as opposed to 'actual reductions,' which would rely on water quality monitoring data that were not available in sufficient quantity for this evaluation.

2012. In terms of estimated contributions toward the 2025 Bay-Wide TMDL goal, these figures represent reduction contributions of 0.54% for nitrogen, 0.31% for phosphorus, and 1.21% for sediment.¹⁶ Based on analysis conducted by the Chesapeake Bay Program Office (O. Devereux and J. Sweeny) using the CAST tool, estimated total cost for reported implementation Bay-wide between the four years 2009-2013 was estimated at \$1 billion (\$1.064B). NFWF's investment towards the 34 projects modeled was approximately \$16 million, with an additional \$24 million in matching dollars, for a total of \$40 million. While these figures give a sense of the comparative magnitude of spending, they are not directly comparable.¹⁷ Full results of water quality modeling are provided in Appendix C.

While there is some variation in which projects produce which kinds of reductions (e.g., atypically high reductions for an urban project composed of a bioswale, biofilters and stormwater wetlands), greatest total load reductions more often tend to occur for agricultural projects while smallest load reductions more often tend to occur for urban projects.

These estimated reductions account for only the subset of INSR projects that had been fully implemented at the time of this evaluation (~30% of INSR projects included in this evaluation) and thus represent just a small portion of estimated load reductions to the Bay. Nevertheless, they demonstrate that innovative approaches are contributing to water quality improvements.

Most effective INSR-funded practices and approaches

Because most INSR projects contained a variety of specific kinds of BMPs within a single project, it is not possible to disaggregate the influence of specific BMPs on load reductions. Qualitatively, however, projects responsible for the top five highest-achieving estimated nutrient and sediment load reductions included pasture management, soil and water conservation plans (combinations of site-specific practices aimed at reducing soil loss), nutrient management for nitrogen and phosphorus reductions, and conservation tillage for sediment reductions. All five projects were agricultural BMPs except for a project in the Conewago Watershed of Pennsylvania which also contained cropland conversion to forest.



¹⁶ Estimated load reductions (nitrogen, 370,000 lbs.; phosphorus, 15,000 lbs.; sediment, 16,000,000 lbs.) can also be compared to a No Action (pre-BMP) baseline, which yields estimated reductions of 0.70% nitrogen, 0.55% phosphorus, and 0.79% sediment loads to the Bay for the modeled INSR projects.

¹⁷ These figures include both costs of implementation to achieve water quality improvements as well as outreach and dissemination to foster further adoption. Since CAST estimated total costs and NFWF's investment cost for modeled projects are calculated differently (e.g., CAST estimates do not include outreach/dissemination, but do include other factors), we cannot relate NFWF investments to overall costs directly.



A project involving eight different subcategories of forest and agricultural BMPs in one watershed spanning Lancaster, Dauphin, and Lebanon counties in Pennsylvania, achieved the greatest average percent nitrogen reductions (estimated), with cover crops accounting for the greatest acreage. Other top-ranking projects for nitrogen include nutrient management in 24 watersheds in Pennsylvania and Virginia, and nutrient management in addition to four other subcategories of agricultural and urban BMPs in one watershed in Accomack, Virginia (using fewer acres BMP than the other top projects). Conservation tillage also featured prominently in efforts with highest average nitrogen reduction.

For phosphorus, greatest average percent reductions (estimated) were achieved via stream restoration in four watersheds in New York, using fewer acres than 12 other projects. Two projects featuring nutrient management also achieved second and third-highest phosphorus reductions. Urban practices featuring bioretention and pervious pavement yielded notable phosphorus reductions in a couple of projects.

Greatest average percent reductions (estimated) for sediment resulted from two projects featuring cover crops and stream restoration, with the third-highest average reductions produced by a project emphasizing conservation tillage and cover crops in 11 watersheds in Lycoming, Pennsylvania.

Implications for findings of effectiveness

Implementing the same set of BMPs in a variety of watersheds can result in a wide range of different load reductions depending on the characteristics of the watershed selected. On a per-watershed basis, some specific grant/HUC12 combinations that implemented urban BMPs outperform other specific grant/HUC12 combinations implementing agricultural BMPs. This underlies the complexity of predicting BMP impacts in different watersheds, and indicates the need for the use of a standardized load reduction estimation tool (e.g., BayFAST¹⁸ or FieldDoc¹⁹) if proposed nutrient and sediment reduction approaches in different areas of the Bay watershed are to be considered side-by-side as part of NFWF grantmaking.

¹⁸ Rigelman, J. R. and Devereux, O. H. 2014. Bay Facility Assessment Scenario Tool. Available at: www.bayfast.org. Last accessed: 21 January 2017.

¹⁹ Chesapeake Commons. 2017. Accessible at: <http://help.fielddoc.org/>

Implications for NFWF grantmaking, given this complexity, can also be considered by looking at INSR innovative approaches beyond the physiographic or hydrogeomorphic characteristics of the landscape that may be influencing degrees of success with nutrient and sediment reduction. These innovations are discussed in the subsequent section on most innovative INSR approaches.

Spatial distribution of modeled nutrient and sediment reductions

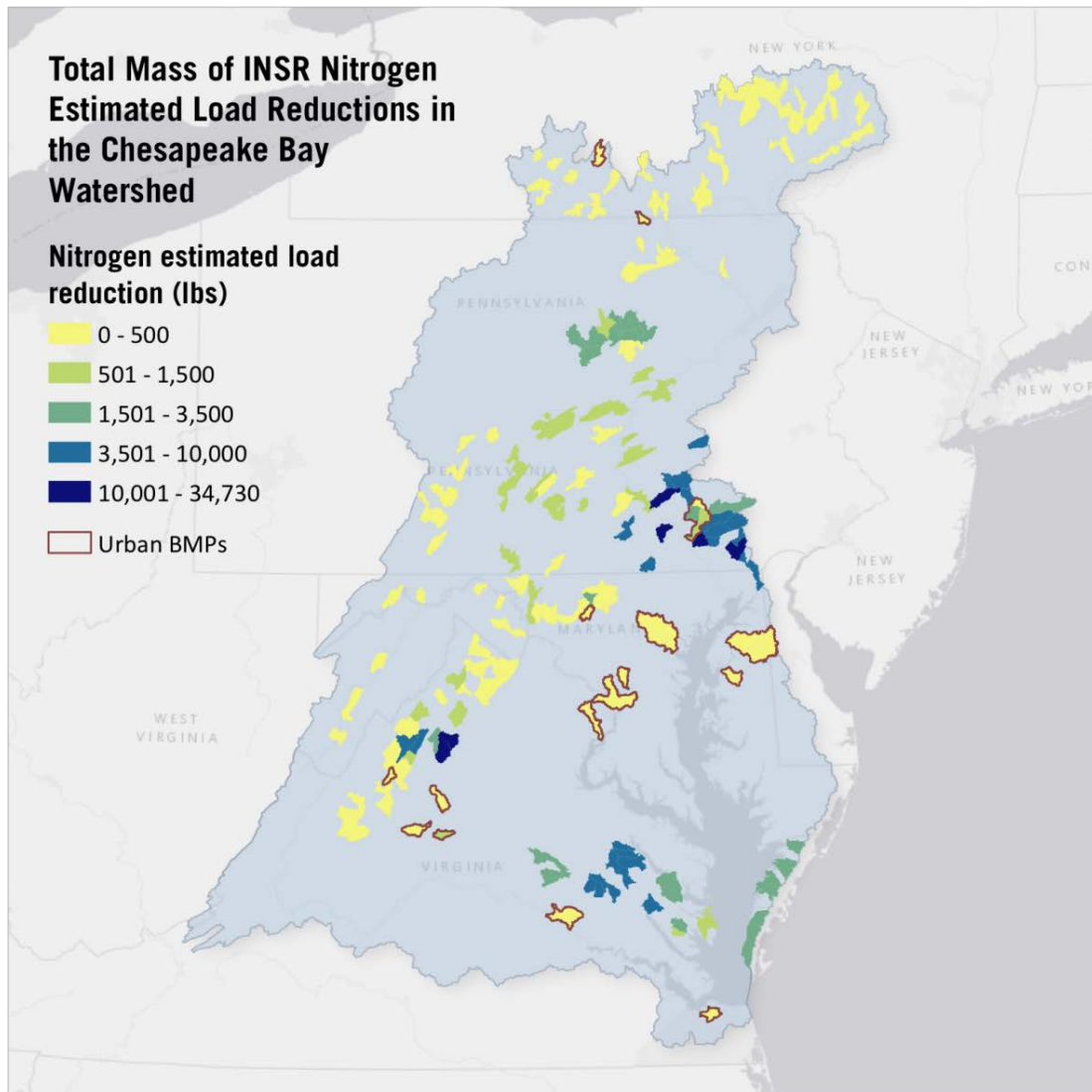


FIGURE 3. Total mass of estimated nitrogen load reductions within a HUC12 for modeled INSR projects

Highest estimated nitrogen load reductions were observed for projects implemented in Virginia and Pennsylvania (Figure 3), most of which have multiple projects modeled in the same HUC12,

or projects which contain several different kinds of BMPs (e.g., a project in rural Lancaster, PA, involving cover crops, conservation tillage, and nutrient management.) Urban BMPs typically produce the lowest total nitrogen load reductions.

Greatest estimated phosphorus reductions occurred in HUC12s with multiple projects (Figure 4), mostly agricultural BMPs in Virginia, using livestock exclusion and conservation plans, and nutrient management and conservation plans in Chester, PA. Urban BMPs tend to have the lowest total phosphorus reductions, except for bioretention systems in Albermarle, VA, and stream restoration in Schuyler, NY.

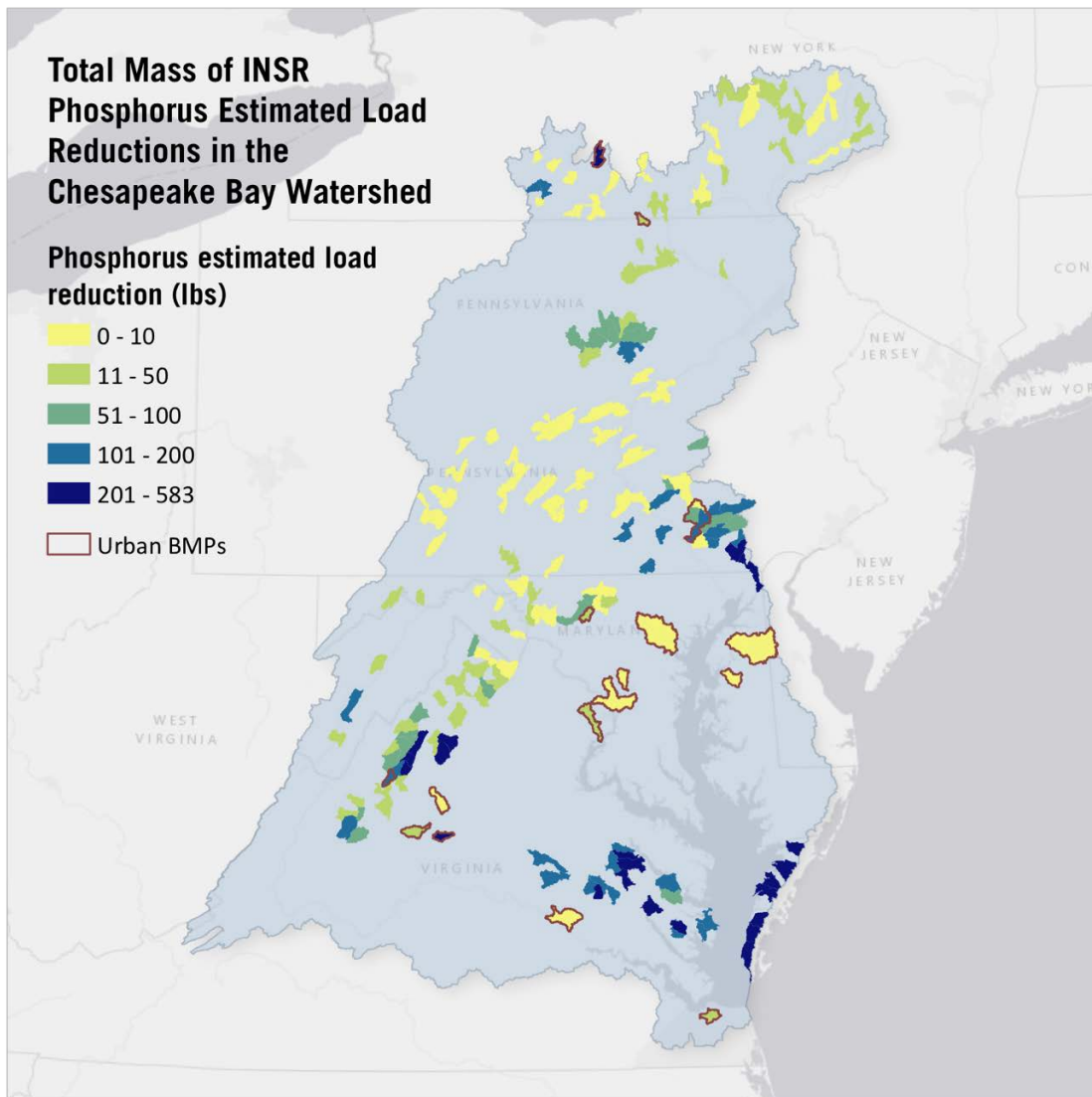


FIGURE 4. Total mass of estimated phosphorus load reductions within a HUC12 for modeled INSR projects

Finally, sediment (Figure 5) had estimated highest total load reductions where soil and water conservation agricultural BMPs were implemented in Pennsylvania, and near Shenandoah, VA, where multiple agricultural projects were implemented in the same HUC12s, which consisted of livestock exclusion, conservation plans, and pasture management.

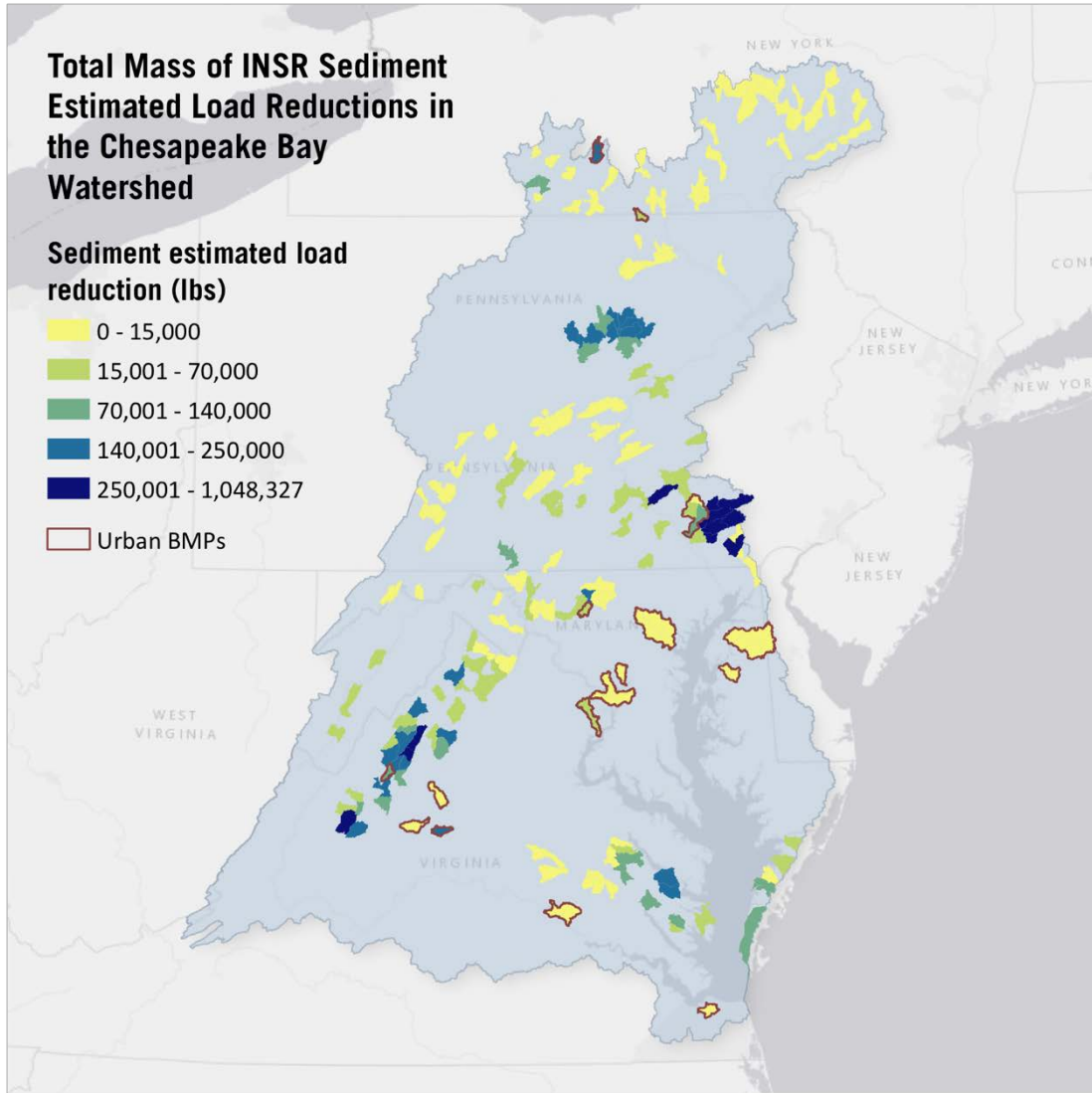


FIGURE 5. Total mass of estimated sediment load reductions within a HUC12 for modeled INSR projects

Most innovative INSR-funded approaches

INSR-funded innovations (Table 1) were categorized by sector and novelty, such as whether an approach (INSR innovation) was completely new or experimental, or whether an approach was an improvement and/or new application of an existing practice (Appendix D). Innovations were then assessed using three criteria: 1) technical effectiveness; 2) cost-effectiveness; and 3) transferability.^{20,21,22} In terms of overall effectiveness, novel, previously-untested approaches were roughly on par with new applications utilizing more established Bay watershed practices, with both groups finding low or mixed success in some cases but in many cases good success—both technically and in terms of cost-effectiveness. Since survey results found that evidence of both technical and cost-effectiveness are key drivers for adoption, these factors are important in understanding what is working across the Bay watershed, along with how transferability – how feasible it may be to widely apply the technology or approach to achieve nutrient and sediment reductions elsewhere in the watershed.

Most innovative INSR approaches: Agriculture

Of the eleven categories of agricultural innovations funded by INSR, most consist of improvements or new applications of existing practices (8) while three are new and novel. Of those new and novel approaches, use of bioreactor practices to mitigate subsurface nutrient transport has found success, both in terms of technical implementation and cost. Certain manure management approaches have also found success, such as a project in Lancaster County, Pennsylvania, which is improving management of livestock and poultry manure through community-based composting. The project brought partners together to demonstrate and establish the effectiveness of appropriate-scaled, on-farm composting. Other novel approaches for managing ammonia emissions and dry poultry litter found less success but gained valuable lessons learned to share with others. Among those agricultural innovations employing more established practices in new ways, two farmer-to-farmer mentor programs to increase BMP adoption and also new approaches to working with the Plain Sect community stand out as both successful, low-cost, and holding promise for more widespread transferability. In addition, a supply-chain-based nutrient reduction program in the Shenandoah Valley was successful in connecting the food production community with state agencies to implement voluntary practices on poultry and dairy farms to reduce nutrient loads and holds promise for greater transferability.

Most innovative INSR approaches: Stormwater

A variety of INSR approaches in the stormwater sector are succeeding and showing promise in terms of both technical- and cost-effectiveness. Nearly all stormwater approaches rank high in

²⁰ Innovation criteria determined by NFWF.

²¹ US EPA, 2014. Promoting technology innovation for clean and safe water: Water technology innovation blueprint – Version 2, US EPA. Available at: https://www.epa.gov/sites/production/files/2014-04/documents/clean_water_blueprint_final.pdf

²² NFWF, 2016. Chesapeake Bay Stewardship Fund 2016 Request for Proposals. Available at: <http://www.nfwf.org/chesapeake/Pages/2016%20Chesapeake%20RFP.aspx>

terms of transferability except for floating wetlands, which is still in a more experimental stage of innovation. Stormwater management INSR innovations found moderate to high technical success in most cases, with evidence of moderate cost-effectiveness most often the case when information is available. The use of treatment trains to manage flow and quality of stormwater runoff in a project on the University of Maryland, College Park, campus was particularly successful in installing various retrofits. Use of subsoiling and application of soil amendments to compact urban soils was also successful and holds good promise for transferability elsewhere. Both novel and new applications were employed for stormwater innovation to increase coordination among location governments (moderate to high success) and expand capacity of local governments to finance stormwater improvements through private and public funding. Like many innovative approaches, processes and associated learning, partnership-building, and required institutional changes take time for full implementation before water quality effects can be demonstrated. In the meantime, many valuable lessons have been learned and shared among INSR grantees and other Bay partners.

Most innovative INSR approaches: Habitat restoration and Multi-sector innovations

Among habitat restoration and multi-sector innovations funded by the INSR program, these approaches have had largely mixed or moderate success, both technically and in terms of cost (where available). The conversion of turf to trees received high marks for technical- and cost-effectiveness as well as transferability. Watershed-scale efforts coordinating across agricultural and non-agricultural partners have found success, as has the use of decision support tools to increase adoption and maximize benefits for forest buffer and riparian restoration. In addition, market-based trading programs for increased agricultural conservation and stormwater management have found success in some areas, notably in Lycoming County, Pennsylvania, where a local water quality trading program was implemented and attributed to the achievement of water quality benefits in the form of agricultural and stormwater BMP implementation projects and significant community involvement.

Nearly all INSR approaches have been adopted by others in the Bay watershed

- **95% of INSR approaches have been adopted by others²³ in the Bay watershed. Technical- and cost-effectiveness are the primary drivers for adoption. INSR practices adopted by Bay watershed groups are widely distributed across the Bay watershed.**
- **In total, 568 instances of INSR adoption were reported by non-grantees (410 instances) and grantees (158 instances) across the Bay watershed. Location data on these reported sites of adoption are much more limited.**
- **Most adopters (82%) have fully implemented and/or sustained their adopted INSR approach. Examples of some of the INSR approaches most-adopted in the Bay watershed include: use of natural stream restoration methods for sediment reduction; local, cross-sector water quality nutrient trading; and innovative, low- impact design and stormwater retrofits. Information sharing and dissemination facilitated adoption.**
- **INSR grantees and other Bay partners prefer informal modes of information sharing, yet also value workshops and conferences to learn about innovative approaches.**

Adoption of INSR approaches by non-grantee watershed groups and INSR grantees

Non-INSR grantee watershed groups reported having adopted 95% of a variety of INSR-funded innovative nutrient and sediment reduction practices and approaches across sectors. INSR grantees reported having adopted 85% of INSR-funded innovative nutrient and sediment reduction practices and approaches across sectors for which they were not funded (Table 2).

²³ Throughout this report, INSR grantee organizations ('grantees' or 'INSR grantees') are distinguished from other Bay watershed groups for purposes of understanding differences in dissemination and adoption of the INSR-funded approaches both among and beyond INSR grantee organizations. Organizations that have not received INSR funding are referred to interchangeably as 'non-grantees,' or 'other Bay watershed groups.'

TABLE 2. Types of approaches (#, %) adopted by non-grantees (n=29) and INSR grantees (n=11)

Sector	# of INSR Approaches Listed for Selection	Types of INSR Approaches Adopted by Non-grantees # (%)	Types of INSR Approaches Adopted by INSR Grantees # (%)
Agriculture	25	24 (96%)	18 (72%)
Stormwater	30	29 (97%)	30 (100%)
Habitat Restoration	16	15 (94%)	13 (81%)
Multi-sector	2	1 (50%)	2 (100%)
Septic Systems	1	1 (100%)	0%
TOTAL	74	70 (95%)	63 (85%)

There was a total of 568 reported instances of adoption across INSR grantees and non-grantees that ranged across a diversity of sectors and approaches (Table 3).

TABLE 3. Numbers of adopters reporting instances of adoption in each sector

Sector	Instances of non-grantee adoption	Instance of INSR grantees adoption without NFWF funding	Total reported instances of adoption
Agriculture	122	25	147
Stormwater	158	97	255
Habitat Restoration	116	31	147
Multi-sector	9	5	14
Septic Systems	5	0	5
TOTAL	410	158	568

Grantee estimates of INSR adoption in the Bay watershed

INSR grantees were asked to estimate the number of sites at which they believed their *primary* INSR-funded approach had been adopted. Grantees reported the known or estimated number of sites where others had adopted their primary approach; approaches with the largest number of reported sites are shown in Table 4.

TABLE 4. Known or estimated number of sites reported by grantees where their primary INSR-funded approach has been adopted

INSR approach reported by grantees as adopted by others	Known or estimated number of adoption sites as reported by grantees
Implementation of low impact development and stormwater management practices using public-private partnerships (e.g., privately-financed practices, stormwater trading)	2,000 sites ²⁴
Use of treatment trains of innovative best management practices to manage flow and quality of stormwater runoff	150 sites
Increasing agricultural best management practice adoption/implementation by implementing a farm certification program to increase compliance with conservation and nutrient management requirements	132 sites
Use of multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems	101 sites
Riparian conservation using decision support tools and flexible design standards	100 sites
Training and education: implementation of online stormwater management training and education to a wide-range of users	68 sites

Most-adopted INSR approaches by other Bay watershed partners

Non-grantees also reported instances of INSR approaches they had adopted. Combined on-farm and stream corridor practices was the most-adopted agriculture approach with use of a watershed-scale approach to agricultural nutrient reduction falling close behind. Promotion and/or adoption of low-impact design and retrofits was the most frequently adopted stormwater approach by other watershed groups. The most frequently adopted habitat restoration approach was use of natural stream restoration methods for sediment reduction.

Extent of implementation of primary adopted approaches

Non-grantee adopters were asked to identify a primary approach they adopted and the degree to which their primary adopted practice or approach has been implemented and/or sustained. Nearly half of these adopters reported having fully implemented *and* sustained the approach; one-third reported fully implementing their approach; and, 18% of these adopters reported they

²⁴ Elizabeth River Project’s River Star Homes program engaging homeowners in committing to behaviors to improve water quality to the Elizabeth River.

had started to implement and are continuing to work toward full implementation. Together, over 82% reported having fully implemented and/or sustained their primary INSR approach. Although limited, these results show that other Bay watershed groups have decided to adopt nearly all INSR-funded innovative approaches. Further, they provide evidence that many adopted INSR approaches have been fully implemented and/or sustained.

Clustering projects has fostered adoption of INSR approaches by others

Clusters of adopted INSR practices in certain areas correspond with regions in which dissemination of INSR-funded practices and approaches was concentrated and sustained over time by multiple INSR-funded grantee organizations (Figure 6).²⁵ These areas include the areas of Lancaster, Pennsylvania; Shenandoah Valley region of Virginia; the Washington DC metro area, and areas of north central Pennsylvania.

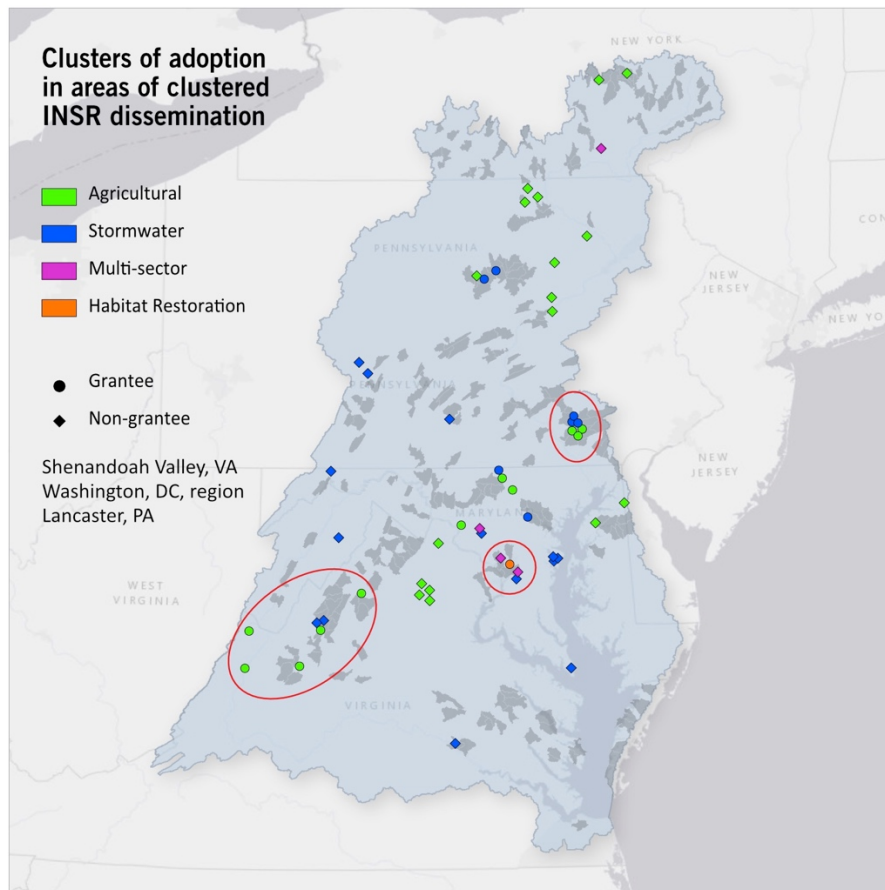


FIGURE 6. Clusters of adoption in areas of clustered INSR innovation dissemination

²⁵ Site location information was only reported for 27% of INSR approaches that survey respondents (grantee and non-grantee) reported adopting.

Adoption of INSR approaches in these areas as reported by survey respondents provides evidence for uptake of INSR-funded practices in areas where investments in dissemination and other forms of information sharing have been made by INSR grantee organizations.

Lancaster, PA²⁶

Dissemination of INSR-funded practices was supported and sustained in the Lancaster, PA, region via six INSR grants starting in 2010 and continuing through grant year 2015. Survey results show that grantees reported six sites in the Lancaster area where INSR practices have been adopted (beyond those funded by INSR grants) (Figure 5). These practices included implementation of whole-farm conservation systems in three locations and adoption of low-impact design and retrofits for stormwater management in three locations.

Dissemination activities promoting these practices included but were not limited to: stormwater management demonstrations in and for the City of Lancaster; disseminating results from demonstration farms to animal farm operators across Pennsylvania; and presentations and education to wide ranging audiences on diverse aspects of farm stewardship.



Shenandoah Valley region, VA

Dissemination of INSR-funded practices was supported and sustained in the Shenandoah Valley region of Virginia via seven INSR grants starting in 2009 and continuing through 2015. Survey results show that grantees reported a total of five sites in the Shenandoah Valley and additional

sites east and west of the Valley where INSR practices have been adopted (beyond those funded by INSR grants) (Figure 6). These practices were largely agricultural sector approaches and included but were not limited to: increasing agricultural best management practice adoption and implementation by connecting water quality improvements to food system sustainability; use of green infrastructure; and adoption of a watershed scale program or approach for stormwater management.



²⁶ Other adoption sites reported and shown in Figure 6 include 13 specific sites in other areas of Pennsylvania, plus additional sites 'throughout Pennsylvania' (reported without specific location information) for which Lancaster-based dissemination efforts may have reached via state-wide dissemination efforts of some activities and events.

Dissemination activities in the Shenandoah Valley area promoting these practices included but were not limited to: delivery of information to growers and other industry and natural resource agency personnel on the environmental and cost-effectiveness of various ammonia reduction strategies from poultry house emissions, and outreach focused on aquatic conservation of the Potomac and Shenandoah headwaters, focusing on stream and brook trout conservation.

Washington DC metro region

Dissemination of INSR-funded practices was supported and sustained in Washington DC and the surrounding region via six INSR grants starting in 2009 and continuing through grant year 2015. Survey results show that grantees reported four sites in the Washington DC area, and three sites in Annapolis, MD, where INSR stormwater, habitat restoration, and multi-sector practices have been adopted (Figure 6). Adopted practices with reported location information included: use of natural stream restoration methods for sediment reduction; riparian conservation using decision support tools and flexible design standards; and use of “pay for performance” incentives in public conservation programs to maximize nutrient reductions.

Dissemination activities in the Washington DC area promoting these practices included but were not limited to a multi-media campaign for behavior change support in stormwater management practices; training partnerships; professional education via websites, webinars and trainings supporting green infrastructure; and engagement with professionals and the public to share lessons learned to foster adoption of stream restoration practices.



Influential factors for adopting INSR approaches

Evidence of effectiveness and cost-effectiveness were cited as the top two factors influencing decisions to adopt nutrient and sediment reduction approaches (Table 5). Non-grantees also described ease of implementation within their locations as another criterion for adopting approaches. Most adopters, potential adopters, and intermediaries stated that their primary drivers for adoption were cost- and technical effectiveness. One landscape conservation organization described cost as being “the biggest influence to implementing innovative nutrient and sediment reduction approaches” regardless of sector. Another program focusing on agricultural regulatory and environmental requirements described cost as “the first and foremost [factor when it comes to adoption]. If cost sharing is available, then an approach can become attractive.” In the case of technical effectiveness, one watershed conservation group’s founder described that with any practice he builds, he makes sure that he is “using a technically

efficient approach that emphasizes adaptive management as best as possible – which doesn’t have to translate to the most expensive approach.”

TABLE 5. Top factors influencing decisions to adopt nutrient and sediment reduction practices

Influential Factors	Grantees	Non-grantee adopters
Evidence of effectiveness	67% (n=8)	50% (n=6)
Cost-effectiveness	50% (n=5)	50% (n=4)
Approach recommended by federal, state or local government sources	Not Applicable	43% (n=3)

This demonstrates that programs may not see cost- and technical effectiveness as mutually exclusive and that there are approaches that can maximize both factors.

INSR grantee dissemination practices and target audiences’ preferred sources and formats for receiving information

INSR grantees utilized multiple dissemination strategies, targeted various audiences, and shared different types of information about their respective INSR approaches. While this study did not seek to measure a direct, causal relationship between these activities and the adoption of INSR approaches, the fact that robust uptake of so many INSR approaches has taken place among a relatively small survey sample of Bay organizations suggests that dissemination efforts by INSR grantees were fruitful.

There was strong alignment between the types of information grantees reported disseminating and what potential adopters and intermediaries reported receiving. The top three types of information disseminated were: 1) information describing their approach; 2) information about the technical effectiveness of their approach; and, 3) information about how their approach was innovative. Non-grantees stated they received similar information and found it useful when considering adopting new approaches. One type of information that adopters and potential adopters reported as important to their decision-making on adoption was evidence of cost-effectiveness; however, this type of information was not reported by grantees as a prominent type of information they shared.

Alignment between grantee target audiences and preferred information sources

Common primary audiences for dissemination identified by grantees also overlapped with common sources of information by others in the watershed (Table 6). Specifically, adopters,

potential adopters, and intermediaries preferred information about approaches from conservation professionals (e.g., non-profit technical assistance providers and professional membership organizations) as well as government entities, especially the Soil Conservation Office, indicating that stakeholders’ preferred sources of information align with the target audiences to which grantees disseminate information.

TABLE 6. Alignment between grantees’ primary audience and adopters’ preferred information sources (n=35)

Grantees’ primary target audiences	Non-grantee adopters’ preferred sources of information
1. Policy makers/government officials	1. Soil Conservation Offices
2. Conservation professionals	2. Non-profit TA providers
3. General public	3. Professional membership organizations

Meeting presentations to government officials and community organizations

Grantee survey findings show that presentations to local government officials and community groups was the most commonly used dissemination approach for sharing INSR practices and approaches with the broader Bay community. One grantee interviewed described having real success in making presentations to state officials and municipalities in positions to affect change, reporting that being able to present to these officials resulted in partnerships which continued to advance their efforts to reduce urban runoff and restore infiltration in highly disturbed soils. Grantees also valued being able to tell their story repeatedly to community organizations, as it led to mutual and successful information-sharing to others doing or considering similar work.

Conference presentations to conservation professionals and others

Presentations at professional conferences were popular outlets for both grantees and non-grantees. One adopter who leads an organization that works with local communities to protect and restore ecosystems, stated “Reaching colleagues and others like us through workshops and conferences is very helpful.” Professional conferences provide an opportunity to reach like-minded organizations that are currently outside of a program’s regular sphere of communication.

Outreach events to the Community

Several INSR grantees identified community outreach events in both the urban and agricultural sectors as an effective way to raise awareness and engage community stakeholders. These grantees described their goal of creating behavior change in the community to reduce watershed pollution at the consumer level. For example, one stormwater based program focused on inspiring the community by hosting an annual festival along the river to reduce algae bloom in their local river.

Other awareness-raising and engagement activities for diverse audiences

Grantees discussed holding community days, site tours, workshops, and trainings to share lessons learned from their work with the community that “lives on beyond the life of our grant.” One grantee also described the successful publication of their work in a journal article and their selection by a well-regarded, national organization as one of the top 16 high-valued research contributions from all State DOTs for 2016. This recognition provided them “some automatic credibility in talking to other State DOTs about this practice,” thus helping them disseminate their approach and practices further.

Alignment between common and preferred information formats

Alignment was also found between grantees’ most common dissemination activities and the most preferred information formats of adopters, with meetings and conferences and the mix of formal and informal modes of communication they afford as preferred formats for all (Table 7). Fact sheets and how-to manuals were similarly aligned, though these formats can differ significantly. In-person trainings remain a top choice by both disseminators and adopters. When asked which formats they perceived to contribute most to facilitating adoption, in-person trainings and workshops scored highest, consistent with adopter preferences; interestingly, however, grantees also perceived the use of educational online videos as strongly facilitating adoption, though, in contrast, this format was not indicated as a preference by adopters.

Importantly, while these preferences emerged, and were often aligned by those disseminating information, several non-grantee Bay partners who were interviewed stated that no single communication mechanism was the key to success in disseminating innovative approaches and practices. As one adopter described, “...one thing I learned is that it’s not one mechanism for effective communication. You need to invest in a number of different strategies.”

Top modes of grantee dissemination also aligned with those most frequently used by adopters of INSR approaches, 94% of whom reported further disseminating information about those approaches, indicating a ‘ripple effect’ of information about INSR-funded innovations throughout the Bay watershed.

TABLE 7. Alignment between grantees’ most common dissemination activities and adopters’ most preferred information formats (n=35)

Grantees’ most common dissemination activities	Adopters’ most preferred information formats
1. Presentation at meetings	1. Informal communications
2. Professional conferences	2. Professional conferences
3. Publishing fact sheets	3. How-to manuals
4. In-person trainings	4. In-person trainings

Relationships between individuals, and the partnership- and trust-building that can grow from those relationships over time, emerges as an important underlying factor for effective communication. As one grantee stated:

Often another way I see innovation advancing more quickly is through partnerships and working together. It works much faster when people are putting practices on the ground and seeing variability and sharing that with others and researchers.

Consistent with this finding, results demonstrated that adopters’, potential adopters’, and intermediaries’ most-preferred format for receiving information was through informal communication (e.g., e-mails or conversations with colleagues and peers, word-of-mouth). Several non-grantees shared examples of how farmers in their communities who are using cutting-edge approaches and practices are often the same individuals who are respected and recognized as leaders and mentors in the farming community. For example, one adopter stated:

We need farmers who are leaders in community. If the farmer says a practice is successful, other farmers will follow suit. This is also how we advance innovative practices. Some of the most successful farmers are willing to listen and adopt things on a bigger scale.

Thus, informal communication is also valued as an effective means for those disseminating information, as well as to those on the receiving end of information sharing.

Role of Chesapeake Bay watershed networking forums in information sharing

NFWF funds the Chesapeake Bay watershed networking forums through the INSR program via directed (e.g. non-competitive) awards. The most popular networking forum identified by grantees was the Chesapeake Watershed Forum, in which 67% of grantees said they had

participated. Of those who participated in the Forum, 70% had participated to disseminate information on INSR approaches. Grantees also participated in the Bay watershed’s three other forums (Bay-wide Stormwater Partners Retreat, Chesapeake Agricultural Networking Forum and Chesapeake ForumPlus) though to a lesser extent. Most grantees interviewed found NFWF-sponsored forums to be valuable for networking and learning about innovative approaches. Grantees also reported learning of other INSR-funded practices at forums and then tailoring and adopting them to meet the needs of their site-specific contexts. Said one grantee:

The Agriculture Forum that NFWF holds has always been beneficial. We commonly have a few staff go. We’ve picked up some other ideas that we’ve brought back and have molded into our own and put those back out as grant projects to NFWF that they funded. Always good to hear what’s going on in other parts of the Bay region.

Thus, the forums are an opportunity for disseminating information on innovative approaches with other programs who are interested in those types of approaches.

Other types of dissemination assistance desired by grantees

Grantees were asked what type of dissemination assistance from NFWF might generally be desired. (Figure 7).

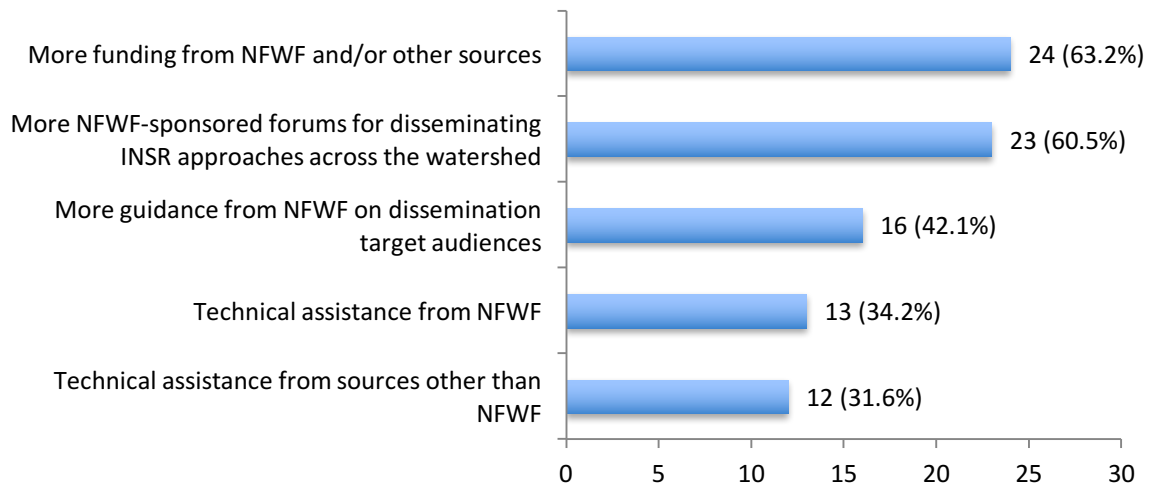


FIGURE 7. Most common types of assistance with dissemination desired by grantees (n=38)

More than half of grantees indicated they wanted additional funding from NFWF or other sources. Additionally, funding for dissemination post-implementation was also described as important to keeping momentum following grant completion:

[It's] hard to maintain conversation around [a complete] project when there is no funding. We had a vision to slowly start greening our city, but with limited funding, we had to let go of ideas. Hard to keep the momentum.

Both grantees and non-grantees acknowledged the challenges NFWF faces in disbursing limited funding; however, several programs stated that if opportunities existed to fund or support the sharing of information for innovative approaches after grant completion, it would be beneficial to expanding dissemination opportunities.

CONCLUDING OBSERVATIONS AND RECOMMENDATIONS

NFWF is viewed as integral to the success of improving the health of the Chesapeake Bay. The INSR program has achieved measurable reductions in nutrient and sediment loads to the Bay through relatively low-cost grantmaking that has also leveraged additional adoption of innovative approaches throughout the Bay watershed. The evaluation team makes the following recommendations to help NFWF further strengthen its role in the Chesapeake Bay watershed and expand the adoption of successful and innovative approaches to nutrient and sediment reduction.

Recommendations for INSR grant making based on water quality outcomes and clustering in targeted subwatersheds

1. Carefully consider multiple program goals in grantmaking and project siting

The INSR program should balance goals for water quality improvements with its goals to identify and disseminate innovative, yet unproven, approaches with potential for success. Evaluation of the most innovative practices shows that innovation takes different forms to achieve various ends, including experimenting with new technologies, building new partnerships and governance structures, integrating knowledge into policy making, and incorporating systems-level approaches. Innovation can be considered either independently or as part of assessments of effectiveness depending on program goals. INSR program goals include fostering advancement of new technologies or approaches and well as identifying what is effective for nutrient and sediment reduction. NFWF should continue to support novel innovative practices and approaches with the understanding that although some will find less immediate success, over time, the program will foster the identification and adoption of those that are most effective.

2. Coordinate standardized collection of project information to better standardize estimated load reductions across the watershed and facilitate grantmaking decisions

Simple conclusions cannot be drawn about the effectiveness of different BMPs implemented in different locations because many factors across the landscape interact to affect load reductions. Load reductions expected to result from implementation of different sets of BMPs are complex and depend on factors including baseline nutrient and sediment loading available for reduction; type of land use in watershed, which affects both baseline loading amount and types of BMPs able to be implemented; and the spatial location of a watershed, which affects soil types, layout of hydrology, hydrologic connection to Chesapeake Bay, and other factors.

To better compare potential load reductions across potential or already-funded INSR projects, a consistent, geographically explicit modeling and reporting tool should be used by NFWF and its grantee community. For example, NFWF could coordinate standardized collection of project information (either in-house or by requiring its grant applicants to report) on proposed BMPs at

the resolution required to be modeled in BayFAST or another selected modeling tool. This way, assumptions about location, acreage, and other modeling inputs can be standardized to reduce error and facilitate comparisons of estimated load reductions.

3. Consider proximity to existing water quality monitoring locations to better compare modeled load reduction estimates as part of grantmaking decisions

When possible, NFWF should consider coordinating grant locations with locations of existing water quality monitoring data to obtain real-world field estimates of load reductions to compare to modeled reductions. Proposed projects could be considered based on factors that would lead to greatest load reductions (e.g., magnitude of baseline nutrient and sediment loads).

Recommendations for sharing information about nutrient and sediment reduction innovations and encouraging adoption

4. Continue to cluster projects to foster further adoption in priority areas

Evaluation findings show that while adoption of INSR practices has occurred across the watershed, clusters of adoption have occurred in areas where clustered INSR projects have sustained focused dissemination over time. While assessing water quality impacts of project clustering was not possible because of data and methodological limitations, reported adoption in regions of project clusters implies that additional water quality benefits are being generated. Since adopters reported their preferred sources of information about nutrient and sediment reduction approaches as including others they know and respect (e.g., local leaders in farming practices) and informal communications with trusted organizations and individuals, a localized context for information sharing is indicated, lending support to continued project clustering to facilitate focused and sustained dissemination efforts in priority areas.

5. Continue to develop, leverage, and support partnerships to facilitate dissemination and adoption of effective and innovative practices

NFWF should continue to build and grow partnerships with organizations that are considered well-connected, trustworthy, and knowledgeable by Bay stakeholders such as soil conservation districts, university extension, non-profit technical assistant organizations, local/municipal governments, and local non-profits. All interviewees described the value of trusted knowledge sources in their communities and the impact these individuals and organizations had on influencing the adoption of innovative practices by other organizations. For example, several interviewees described making regular visits to university extension offices such as Penn State, University of Delaware, and Virginia Tech, for guidance and recommendations on the latest practices in agricultural management. Another interviewee described the value in sharing data with soil conservation districts to obtain a broader perspective on an approach's effectiveness. If NFWF invests the time and resources in building these partnerships, they will have a greater opportunity to raise awareness of the INSR grantees' work with a larger and receptive audience.

6. Further engage the Bay Community by expanding Forum opportunities

Most grantees interviewed described the value of NFWF Forums as an opportunity to learn about and see the innovative practices other programs have implemented to reduce nutrient and sediment in the Bay watershed. Several grantees reported learning of other INSR-funded practices at Bay networking forums and then tailoring and adopting them to meet the needs of their site-specific contexts. If NFWF expands Forum attendance to those outside of the INSR grant program, there is the potential for exposing a greater number of Bay programs to INSR projects. As it currently stands, several adopters, potential adopters, and intermediaries stated that they attend professional conferences to learn about innovative practices as part of their profession. Thus, expanding attendance at Forums would connect NFWF to a broader base of Bay programs with an interest in innovative practices.

7. Continue to provide or support the development of materials that further the dissemination of INSR approaches

Several grantees described how valuable it was for their program to have NFWF's support on dissemination. NFWF should continue to actively provide guidance and support to grantees on the development of content and materials that would help them share their approach with other Bay programs in the watershed. This could include more information (e.g., via fact sheets or case studies) on cost and cost-effectiveness to aid in decisions about adoption. This could also include providing additional funding or guidance on how to develop how-to manuals or guides that could be disseminated to other practitioners; how to provide effective trainings; and presentations or posters at professional conferences. Once programs develop these materials, NFWF should also provide opportunities to share them with the broader Bay community.

8. Continue to support networking activities that maximize informal communication as a means of sharing information

As identified in the findings, informal communication is an effective way for those in the Bay watershed to share information about innovative approaches and practices. NFWF should capitalize on this and engage locally-based organizations who are aware of and have established relationships with well-respected thought leaders in the community so that NFWF has a direct line of communication to those leaders as needed. This could help NFWF share successful INSR approaches that could then be further disseminated to the community.

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APPENDICES

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APPENDIX A

INSR EVALUATION STUDY QUESTIONS

INSR Evaluation Study Questions

A) How have the practices and approaches developed through INSR grants contributed to modeled reductions in sediment and nutrient pollution? Which practices and approaches have been most effective at reducing nutrient and sediment pollution? Which practices and approaches have been most innovative?

B) Has clustering projects in targeted sub-watersheds resulted in greater water quality improvements and increased adoption of innovative practices than distributing projects more broadly throughout the Chesapeake Bay watershed?

C) How has information about the practices and approaches developed through INSR grants been shared with the broader Chesapeake Bay community and to what extent have those practices and approaches been adopted by others in the Chesapeake Bay watershed?

APPENDIX B

EVALUATION METHODS:

DATA SOURCES, ANALYSES and STUDY LIMITATIONS

Online surveys

Two online surveys were developed and administered to address study questions about dissemination and adoption practices among and between INSR grantees and the broader Bay watershed community. The surveys were designed to gather information on whether and how INSR grantees are communicating about INSR project approaches and the extent to which others in the watershed are using these approaches to nutrient and sediment reduction. Surveys were administered online using the SurveyMonkey platform. Surveys were reviewed and approved by an approved Institutional Review Board (Solutions IRB) on July 6, 2016 (Solutions IRB protocol #2016/07/03). The survey instruments used are provided in Appendix E, and selected results are presented in Appendix F.

One survey was designed for INSR grantees (a.k.a. the ‘Grantee Survey’) and a second survey was designed for other Bay watershed partners, broadly defined as organizations as well as government entities and individuals doing work on nutrient and sediment reduction in the Bay watershed (a.k.a., survey of ‘Other Watershed Groups,’ or ‘Non-grantee Survey’). A total of 55 grantees responded to the first survey for a 59% response rate. A total of 105 non-grantees responded to the second survey for a 30% response rate.

For purposes of more refined analyses of survey responses from the non-grantee survey, respondents were asked to identify the role their organization plays in relation to nutrient and sediment reduction, namely: as either a direct adopter or potential adopter of nutrient and sediment reduction approaches, or as an ‘intermediary’ that helps disseminate information or provide other indirect assistance to those who may be directly implementing approaches for achieving reductions. The largest percentage of respondents indicated that they (or their organization) serve in an intermediary role (n=50, 49%). Most intermediaries represented non-profit conservation organizations (n=19, 38%) and government entities (n=12, 24.2%). The second largest group of respondents identified as having adopted approaches for achieving nutrient and sediment reductions (n=35, 34.3%); most adopters represented government entities (n=12, 34.2%) or non-profit conservation organizations (n=11, 31.4%). Fewer respondents identified as someone who would consider adopting approaches for achieving nutrient and sediment reductions but had not yet done so (n=8, 7.8%); this group is referred to as “potential adopters.” Three-quarters of potential adopters were non-profit conservation organization representatives (n=6, 75%).

Grantee Survey

The survey for grantees was split into two parts, “Survey A” and “Survey B,” to allow grantees that had more than one INSR-funded project on *different* approaches to nutrient and sediment reduction to report on the dissemination practices they utilized for each approach. Grantees with one approach to nutrient and sediment reduction only received Survey A. Grantees with more than one INSR-funded project on *different* approaches received both Survey A and Survey B. These respondents were asked to first fill out Survey A, answering questions about one of their INSR approaches, and then fill out Survey B, answering questions about a different INSR

approach. Survey B was a replicate of Survey A but only included questions specifically relevant to the *approach* to measure dissemination activities and outputs for each unique INSR approach. The results from Survey A and Survey B are combined in all analyses in the report.

The survey distribution list for grantees was derived from a list of principal investigators for INSR grants funded as of 2008. Principal investigators listed with more than one different approach were identified and flagged to receive both Survey A and Survey B.

An e-mail request to grantees to participate in the survey was sent July 11, 2016, and the surveys remained open until August 5, 2016. For the grantee survey, a total of 94 survey requests were sent. A total of 55 grantees responded to the survey for a 59% response rate. Of these 55 responses, 49 were fully complete (89.1%) and 6 were partially complete (10.9%).

Non-Grantee Survey

The non-grantee survey targeted representatives of organizations in the Chesapeake Bay watershed who may be working to reduce nutrient and sediment pollution in the Bay and to improve water quality. The distribution list for non-grantees was created using a snowball approach, in which relevant organizations were identified via web searches, and partner organizations listed on those organizations' sites were then also reviewed and added to the list. The list represented a diversity of organizations across the Chesapeake Bay working on water quality and nutrient and sediment reduction issues. Municipalities and local government officials, news organizations, and individuals, such as individual farmers or urban residents, however, were not included in this approach.

An e-mail request to non-grantees to participate in the survey was sent July 25, 2016, and the survey remained open until August 16, 2016.

For the non-grantee survey, a total of 354 survey requests were sent, excluding emails that bounce-backed or were otherwise unavailable. A total of 105 stakeholders responded to the survey for a 30% response rate. Of these 105 responses, 88 were fully complete (83.8%) and 17 were partially complete (16.2%).

Data Analysis

Data from both surveys were analyzed using SPSS 22.0. Descriptive statistics were primarily conducted to analyze survey data. Frequencies and percentages are presented throughout, and means and standard deviations (SD) are presented for 10-point Likert-scale ratings (1 is low and 10 is high).

Survey Respondents

To assess representativeness of grantee and non-grantee survey samples, several variables were assessed, comparing responses between survey respondents and non-respondents.

Grantee survey: Year project awarded

Grantees reported in the survey the year their project was awarded. This information was compared to the years in which projects were awarded across all grantees (Figure 1). Response rates ranged from 25% for projects awarded in 2009 to 69% for projects awarded in 2013. Across all years, responses hovered around a one-third response rate, with slight overrepresentation from projects awarded in 2013 (69% response rate) and 2014 (50% response rate).

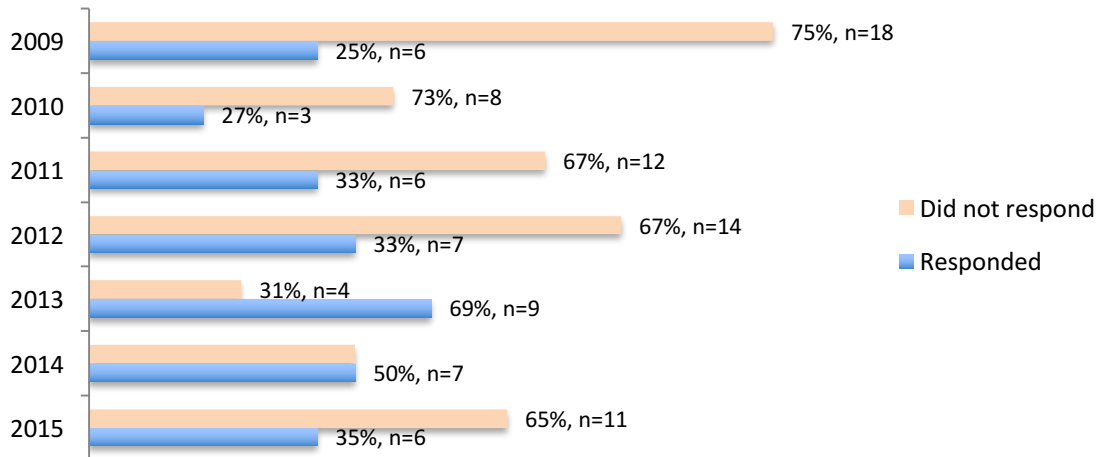


FIGURE B-1. Grantee survey: Year project awarded - Survey respondents vs. all grantees

Grantee survey: Comparisons by state

Grantees provided in the survey their project NFWF Easygrants ID number. This information was used to identify the state or states in which the project was located and then compared to the overall sample of grantees (Figure 2). For the three states with the largest number of projects (Maryland, Pennsylvania, and Virginia), response rates were lowest for projects from Pennsylvania (29%), moderate for projects from Virginia (39%), and the highest for projects from Maryland (48%). Other regions (Washington D.C., Delaware, New York, and West Virginia) had a smaller number of projects across all grantees, and there was representation in the survey sample from all states except Delaware and West Virginia. There were some missing data for survey respondents who did not provide a NFWF Easygrants ID number for their project.

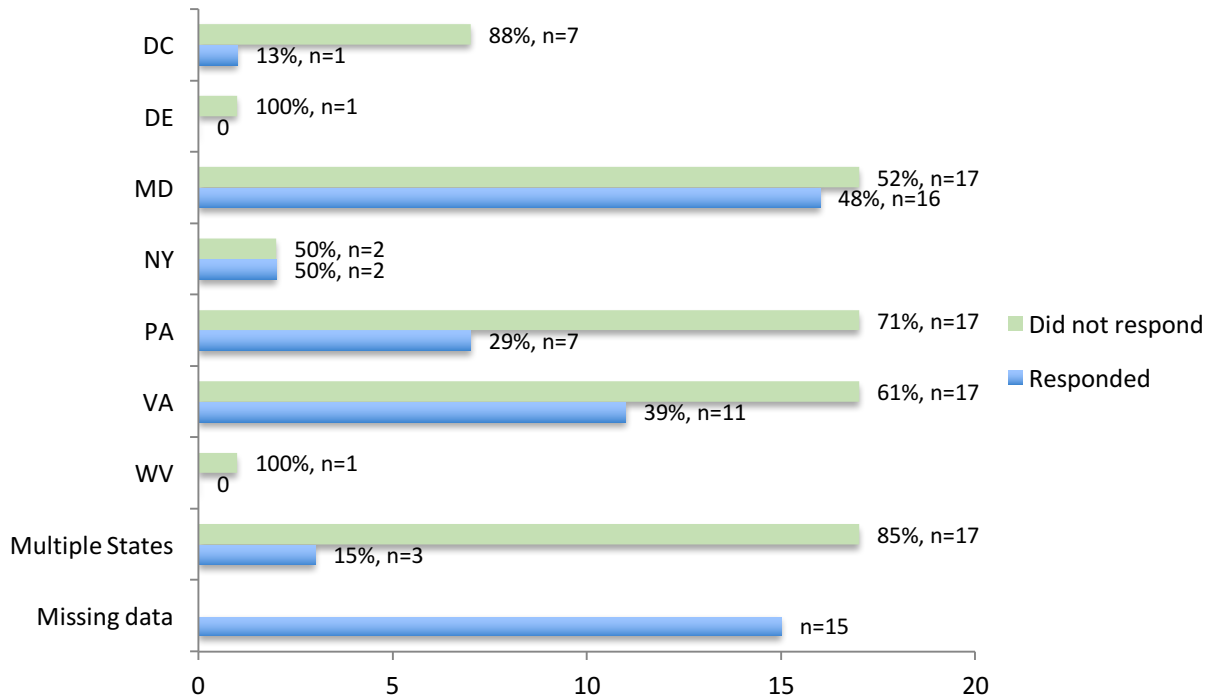


FIGURE B-2. Grantee survey: Project state - Survey respondents vs. all grantees

Grantee survey: Comparisons by sector

Grantees reported their primary sector (e.g., Agriculture, Stormwater) on the survey. This information was compared to the sector associated with each INSR approach listed for all grantees (Figure 3). Response rates ranged from 31% from the Habitat Restoration sector to 100% from the Septics sector (1 project). Generally, the survey sample follows the same sector distribution as the sample of grantees. There were some approaches with an associated sector of “Planning,” which was not a sector option presented in the survey.

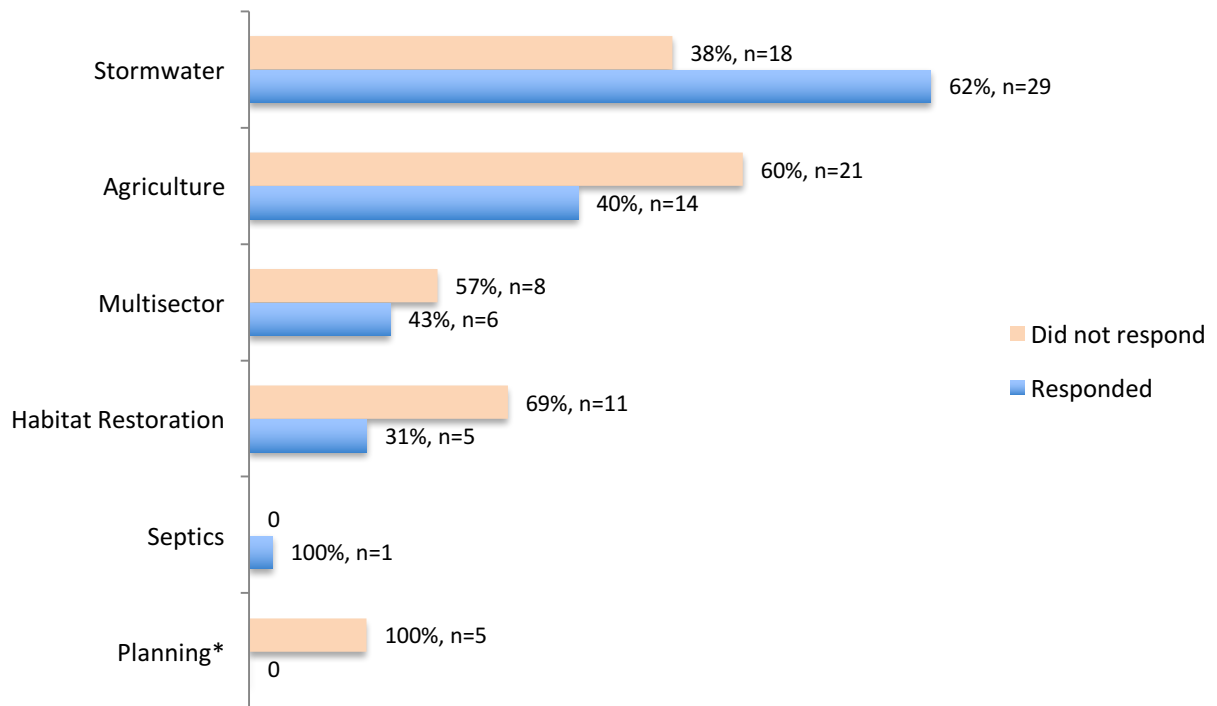


FIGURE B-3. Grantee survey: Project sector - Survey respondents vs. all grantees

Non-grantee survey: Comparisons by state

Information on non-grantees' state was available in the survey distribution list. Response rates ranged from 26% for respondents from Virginia to 66% for respondents from Washington D.C. (Figure 4). Across all states, responses hovered around a one-third response rate, with slight overrepresentation from respondents from Washington D.C. (66% response rate).

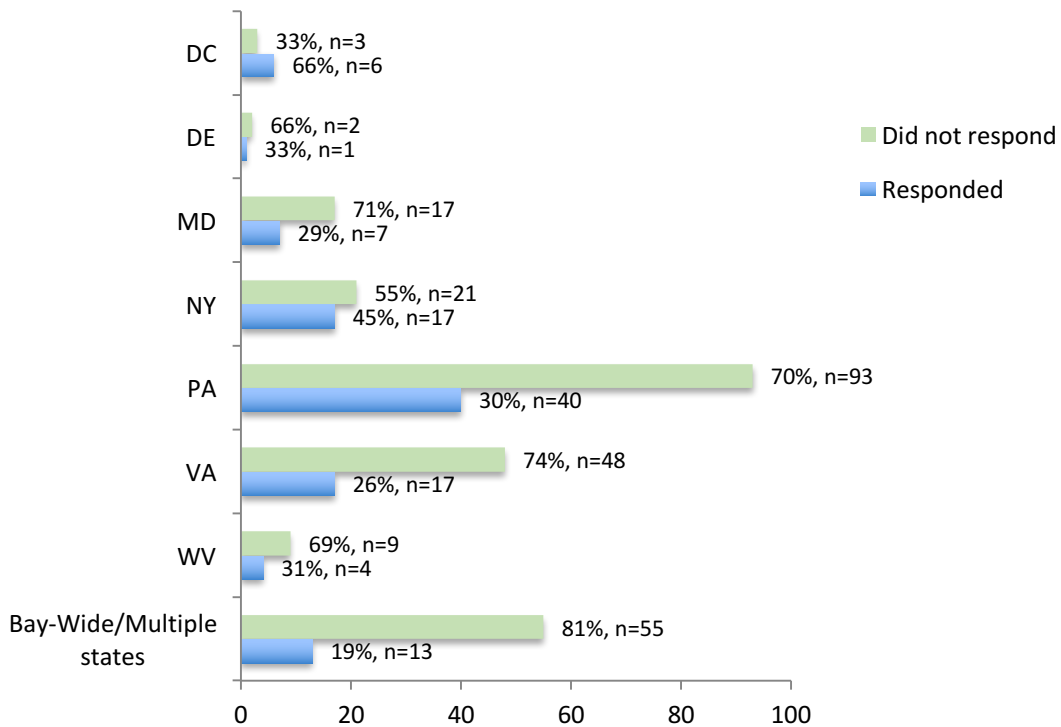


FIGURE B-4. Non-grantee survey: Respondents' state - Survey respondents vs. distribution list

Interviews

We conducted a total of 25 in-depth telephone interviews representing 13 INSR grantees and 12 other watershed groups. Interview protocols were reviewed and approved Institutional Review Board (Solutions IRB) on July 6, 2016 (Solutions IRB protocol #2016/07/03). Interview questions used are provided in Appendix G.

Interviews with INSR grantees

To identify INSR grantee interviewees for recruitment, we reviewed grantee final reports and numerically scored (1, 2, or 3; low to high) the 50 completed INSR projects based on three main criteria: success of technical implementation, cost-effectiveness (to the degree such information was available, in most cases it was not), and extent of dissemination activities completed. We then recruited the top half of the most effective completed INSR projects, based on these criteria, for interviews.

Interviews with other watershed groups

In recruiting interview participants from other watershed groups, we identified the survey participants who self-identified as 'someone who has adopted approaches for achieving nutrient and sediment reductions' (herein referred to as *adopters*); 'someone who would consider

adopting approaches for achieving nutrient and sediment reductions, but I have not yet done so' (herein referred to as *potential adopters*); and 'someone who represents an intermediary that disseminates information about approaches for achieving nutrient and sediment reductions' (herein referred to as *intermediaries*). To recruit interviewees, we conducted purposeful sampling of participants across all three categories to achieve a balance of representation across Bay states (including District of Columbia); a mix of sectors (i.e., agricultural, stormwater, multisector), and a mix of types of organizations (e.g., government sector, private sector, non-profits).

Water Quality Modeling

Estimated nitrogen, phosphorus, and sediment load reductions from INSR-funded projects were pursued using water quality modeling after preliminary analysis by the evaluation team concluded that monitoring data are unavailable at an appropriate spatial resolution to be able to use in answering the evaluation questions. In consultation with Chesapeake Bay Program staff, the evaluation team determined that the Chesapeake Bay Facility Assessment Scenario Tool (BayFAST) (Rigelman and Devereux, 2014) would be an appropriate modeling tool in this evaluation context.

For the sake of continuity, details on the modeling approach, data inputs, assumptions, analysis, uncertainties and limitations are included together with modeling results in Appendix C.

Study Limitations

Modeled water quality data

Limitations of modeled water quality outcomes are discussed in detail in Appendix C.

Interview data

Because the grants had been completed two to three years ago, we experienced challenges in locating several grant managers as they were no longer with the organization that had received the INSR grant, and staff from the organization did not feel comfortable participating in an interview for which they either played a small role or no role at all. Thus, grantee interviews were limited to a smaller portion of INSR grantee input than might otherwise have been obtained had more grantees been available to interview. Future INSR evaluation planning should consider follow up or exit-interview types of data collection from some or all grantees at or nearer to project completion to obtain insights from grantee experiences so valuable information can be captured.

Survey data

Survey data are limited by overall response rates as well as relatively low number of responses to individual survey questions as detailed above and throughout reported findings. In addition, non-grantee survey data are limited to the universe of organizations to which the survey was administered. The survey, for example, was not administered to a range of other potential adopters such as individuals in the watershed (e.g., homeowners, farmers, or others). Certain groups of state, local, and regional governmental officials were also not included in the survey sample, limiting representativeness of non-grantee survey data in this respect.

APPENDIX C

WATER QUALITY MODELING APPROACH, ANALYSES, AND RESULTS

WATER QUALITY MODELING: INTRODUCTION

The potential water-quality impacts associated with implementation of 34 unique INSR project grants across 220 unique subwatersheds (at Hydrologic Unit Code 12 [HUC12] spatial scale) in 5 states and the District of Columbia were simulated using the Chesapeake Bay Facility Assessment Scenario Tool (BayFAST).¹ Three main types of best management practices (BMPs) were represented in these grants: agricultural (99% of all modeled BMPs on an acre-equivalent basis, implemented in 202 [85%] of modeled HUC12s), forest (0.42% of acre-equivalents, 10 [4%] of HUC12s), and urban (0.47% of acre-equivalents, 35 [15%] of HUC12s), grouped into sub-categories in TABLE C-1 for summary purposes.² Six INSR projects and 7 modeled HUC12s contained more than one of these three types of BMPs.

TABLE C-1. Sub-categories of BMP types

Agricultural	Forest	Urban
Livestock exclusion	Forested riparian buffer	Rain barrel
Grass riparian buffer	Cropland conversion to forest	Pervious pavement
Nutrient management	Forest harvest management	Green roof
Critical area stabilization	Stream restoration	Bioretention Systems
Cover crops		Septic system
Pasture management		
Conservation tillage		
Conservation plan		
Wetland restoration		

Six INSR projects could not be modeled as algorithms are not currently available for these kinds of BMPs in BayFAST (e.g., online tool and performance assessment, local ordinance development, low-impact development design competition, new technology for poultry litter, training programs, and stormwater financing and banking).

The goal of this modeling effort was to address the following evaluation questions using water-quality modeling output:³

- How have the practices and approaches developed through INSR grants contributed to modeled reductions in sediment and nutrient pollution?
- Which practices and approaches have been most effective at reducing nutrient and sediment pollution?

¹ Rigelman, J. R. and Devereux, O. H. 2014. Bay Facility Assessment Scenario Tool (BayFAST). Available at: www.bayfast.org. Last accessed: 3 April 2017.

² Sellner, K.G., M. Palmer, L. Wainger, A.P. Davis, B. Benham, E.J. Ling, and G. Yagow. 2012. Metrics and protocols for progress assessment in Chesapeake Bay Stewardship Fund Grants. Final Report to the National Fish and Wildlife Foundation. CRC Publ. No. 12-174, Edgewater, MD. 474 pp.

³ Water-quality modeling using BayFAST was conducted by Dr. Cathy Gibson of Waterwork Analytics. Exponent, Inc. was retained by Dantzker Consulting, LLC, on November 22, 2016 to review, QC, and summarize modeled results and uncertainties.

WATER QUALITY MODELING APPROACH

The BayFAST Model

BayFAST is a spatially explicit, deterministic model (in the sense that it does not provide error estimates concurrent with model outputs) that calculates changes in nutrient and sediment mass loading associated with different kinds of BMPs applied within a specified area. The most recent version of BayFAST models 50 kinds of urban BMPs, 7 septic BMPs, 5 forest BMPs, and 36 agricultural BMPs. Each BMP is associated with known, empirically-derived and vetted nutrient and sediment reduction effectiveness (i.e., % load reduction). Most BMPs are specified in BayFAST in terms of acres to which that BMP is applied (although there are some exceptions, e.g., stream restoration is specified in linear feet). For this evaluation, to have a consistent spatial scale across projects, BMP implementation was modeled at a HUC12 subwatershed scale (i.e., identified at the Hydrologic Unit Code 12 spatial scale, between 10,000 and 40,000 acres).⁴ Given the varying level of location data, the HUC12 was a compromise between detailed field scale data (which was only available for a few projects) and county scale information available for most projects. For a selected HUC12, BayFAST calculated baseline nutrient and sediment loading from the acres of different types of land uses in that HUC12. Then, information describing the type and size of a BMP (e.g., acres, feet, etc.), and the effectiveness of those BMPs, was combined to calculate reductions in baseline loading for that HUC12 and defined set of BMPs.

INSR Project Inputs and Assumptions

Seventy-four INSR reports from project grantees were evaluated for location, type, and size of BMP implementation. If specific BMP implementation could not be confirmed from available information in INSR grant reports, a search for supporting secondary information was conducted. If BMP implementation could not be confirmed from a publically available satellite image, newspaper account, or published report, it was assumed the BMP was not implemented. If only a subset of reported BMPs for a grant could be confirmed from available information, then the unconfirmed BMPs within that grant were not modeled (e.g., only land conversion to pasture but not prescribed grazing was modeled for project MG09).⁵ As shown in TABLE C-2, out of the 74 submitted INSR grantee reports, 28 were interim reports, six described projects for which BMP implementation could not be confirmed, and six could not be modeled in BayFAST since BayFAST does not incorporate modeling scenarios specific to the types of BMPs implemented (

TABLE C-3). BMPs in the remaining 34 grants that were confirmed as implemented were modeled for the purposes of this evaluation.

⁴ U.S. Geological Survey and U.S. Department of Agriculture, Natural Resources Conservation Service. 2013. Federal Standards and Procedures for the National Watershed Boundary Dataset (WBD) (4 ed.): Techniques and Methods 11–A3. 63 p. <https://pubs.usgs.gov/tm/11/a3/>.

⁵ Alphanumeric project grant numbers for modeled grantee projects referenced in this report are unique identifiers applied for purposes of this evaluation and are indicated by MG## (e.g., modeled grant 01, 02, 03, etc.).

TABLE C-2. Summary of INSR grant modeling status

Year	Total number of grants	Modeled	Implemented but could not be modeled in BayFAST ⁶	Implementation could not be determined	Interim report submitted
2009	24	18	0	6	0
2010	11	7	3	0	1
2011	18	6	3	0	9
2012	21	3	0	0	18
TOTAL	74	34	6	6	28

TABLE C-3. Reasons for exclusion from BayFAST modeling evaluation

Year of grant	Reason not modeled in BayFAST
2010	Assessed performance of cover crops and new ways to track cover crops, but grant funded building on-line tool and performance assessment rather than BMP implementation. This grant contributed to nutrient reductions, but cannot capture that in this analysis.
2010	Local ordinance development, but political changes meant that all but one of the ordinances were not adopted. LID design competition, but unclear what was implemented.
2010	Poultry litter new technology; not widely implemented
2011	Urban stormwater LID training and network.
2011	Stormwater financing innovation and examples
2011	Stormwater banking feasibility

For the 34 INSR grantee reports describing completed or partially completed projects implemented between 2009 and 2012, data specifying BMP types, magnitudes, and locations were extracted from

⁶ Described in Table C-3.

the grantee reports and translated into input formats required for BayFAST modeling (HUC12 where implemented, BMP category and magnitude). Sixteen grants reported BMP implementation spanning more than one HUC12 subwatershed; overall 239 non-overlapping grant/HUC12 combinations (in 220 unique HUC12s) were modeled to simulate load reductions for all 34 implemented and modeled grants together overall. Of the 239 grant/HUC12 combinations modeled, 27 (11%) were based on actual reported information for all three categories of input requirements. For the remaining grant/HUC12 combinations, TABLE C-4 and TABLE C-5 show the assumptions made to estimate missing inputs using available information.

TABLE C-4. Assumptions to estimate missing information required for BayFAST inputs

BayFAST input category	Actual	Estimated	Percentage of grant/HUC12 combinations for which this category was estimated
HUC12	Actual HUC12 in which BMP was implemented as reported	If location information at greater than HUC12 resolution was reported, HUC12s to be modeled were selected from that geographic area using a random number generator	83.3% (199/239)
BMP acreage	Number of acres (or other units of area) reported	Units of reported BMPs were converted to acre-equivalencies using assumptions detailed in TABLE C-5	18.4% (44/239)
BMP distribution	Actual locations of specific BMPs reported	Total amount of BMP acreage (reported in aggregate across multiple HUC12s) was assumed to be evenly distributed across all involved HUC12s	82.8% (198/239)

TABLE C-5. Conversion of BMP units reported in INSR grant into acre-equivalencies

BMP	BMP type	BMP units reported	Grant	Assumption made to convert units to acres
Green roof	Urban	Number of roofs	MG04	Green roof is 500 square feet (0.01 acres) ⁷

⁷ Measured with Google Earth.

BMP	BMP type	BMP units reported	Grant	Assumption made to convert units to acres
Soil and water conservation plan	Agricultural	Number of farms	MG05	Farm in Pennsylvania is 78 acres ⁸
Bioretention planters	Urban	Linear street feet drained	MG06	4375 linear street feet drain 1 acre ⁹
Cistern	Urban	Number of cisterns	MG06, MG32	Calculate drainage area required to fill cistern during a 1 inch rain storm ¹⁰
Rain garden	Urban	Number of raingardens	MG06, MG20, MG23, MG33 ¹¹	Rain garden is 200 square feet and drains 600 square feet ¹²
Impervious surface retrofits	Urban	Design plans for low impact development retrofits	MG08	Area calculation and scaling from digitization of reported design plan map ¹³
Biofilter	Urban	Square feet of filter	MG14	14.85 square feet biofilter drain 1 acre ¹⁴
Bioswale	Urban	Linear feet of bioswale	MG14	7.5 linear feet bioswale drain 1 acre ¹⁵
Nutrient management program	Agricultural	Number of famers enrolled	MG16	Farm in Pennsylvania is 78 acres ¹⁶

⁸ Average farm size; <http://www.lancasterfarmlandtrust.org/heritage/farming-lancaster.html>

⁹ Measured with Google Earth.

¹⁰ <http://extension.psu.edu/natural-resources/water/watershed-education/stormwater/cisterns>

¹¹ Total acreage rain gardens reported; assume drainage area/ rain garden ratio of 3:1 to calculate BMP acreage; <http://www.clermontswcd.org/Quickraingardenguide.pdf>

¹² Drainage area/ rain garden ratio of 3:1; <http://www.clermontswcd.org/Quickraingardenguide.pdf>

¹³ DC DOT webpage (<http://ddot.dc.gov/>) indicated the low impact development retrofits in one of the areas outlined in the report were completed. Google Earth used to measure areas and validate curb bumpouts.

¹⁴ Reported in INSR grant document.

¹⁵ Reported in INSR grant document and verified with Google Earth (drained a soccer field complex)

¹⁶ Average farm size; <http://www.lancasterfarmlandtrust.org/heritage/farming-lancaster.html>

BMP	BMP type	BMP units reported	Grant	Assumption made to convert units to acres
Porous pavement	Urban	Number of basketball courts; number of parking spaces	MG20	NBA basketball court is 94 by 50 feet (29 by 15 m) ¹⁷ ; Parking space is 9 feet wide and 18 feet long ¹⁸
Rain barrel	Urban	Number of rain barrels	MG23, MG32	Rain barrel drains 500 square feet (0.01 acres)
Tree planting	Urban	Number of trees planted	MG23	110 trees planted drain 1 acre ¹⁹

TABLE C-6 shows BMPs entered into BayFAST in non-acre units and associated assumptions made to convert to units of acre-equivalency for dataset evaluation and BMP comparison.

TABLE C-6. Conversion of non-acre BMP units modeled in BayFAST into acre-equivalencies

BMP	BMP type	BMP units in BayFAST	Grant	Assumption made to convert units to acres
Manure composting facility	Urban	Tons of nutrients leaving the watershed ²⁰	MG02	8-foot-tall composting containers ²¹ , calculate area from volume compost
Stream restoration	Forest	Linear feet	MG03, MG07, MG12	1 linear foot of stream restoration equals 0.01 impervious acre equivalents ²²

¹⁷ <http://www.sportsknowhow.com/basketball/dimensions/basketball-court-dimensions-diagram.html>

¹⁸ qcode.us/codes/temecula/view.php?topic=17-17_24-17_24_050

¹⁹ Reported in INSR grant document

²⁰ BayFAST BMP scenario used for CAFO (confined animal feeding operation)

²¹ <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=31198.wba>

²² <http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/Documents/NPDES%20MS4%20Guidance%20August%2018%202014.pdf>

BMP	BMP type	BMP units in BayFAST	Grant	Assumption made to convert units to acres
Septic system	Urban	Number of septic systems	MG23	1 septic system equals a total 0.68 acres impervious acre equivalents based on treating 1 inch of rainfall ²³

For modeling purposes, BMP scenarios were selected in BayFAST that most closely resembled BMP descriptions in INSR grantee reports. All acre-unit BMPs were input as acres, not as percentage of watershed affected, and it was ensured there was enough acreage in a HUC12 to apply each set of modeled BMPs. For results summary purposes, reported BMPs were divided into the types by category identified by Sellner et al.,²⁴ as shown in TABLE C-7.

TABLE C-7. BMPs by sub-category

Agricultural Projects:	
Sub-category:	Includes/Identified as:
Livestock Exclusion	stream access control with fencing, cattle exclusion & stream crossing, stream bank fencing, access control, stream exclusion, exclusion fencing, stream fencing, fencing
Grass Riparian Buffer	riparian herbaceous cover, riparian buffer, grass buffer on ag lands, grassed waterway
Nutrient Management	nutrient management plan
Critical Area Stabilization	critical area planting, contour farming, mulching
Cover Crops	conservation crop rotation, conservation cover
Pasture Management	prescribed or rotational grazing, landuse change to pasture, high till to pasture, low till to pasture, hayland to pasture, unimproved land to pasture, from corn to pasture, rowcrop to pasture

²³<http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/Documents/NPDES%20MS4%20Guidance%20August%2018%202014.pdf>

²⁴ Sellner, K.G. M. Palmer, L. Wainger, A.P. Davis, B. Benham, E.J. Ling, and G. Yagow. 2012. Metrics and protocols for progress assessment in Chesapeake Bay Stewardship Fund Grants. Final Report to the National Fish and Wildlife Foundation. CRC Publ. No. 12-174, Edgewater, MD. 474 pp.

Conservation Tillage	deep tillage, no till
Conservation Plan	continuous improvement plan (CIP), soil and water conservation plan
Wetland Restoration	landuse conversion to wetland, wetland buffer
Forestry Projects:	
Forested Riparian Buffer	riparian forest, forested buffer
Cropland Conversion to Forest	turf to forest
Reforestation/Revegetation	forest harvest management
Streambank Stabilization	stream restoration
Urban Projects:	
Rain barrels	cisterns, rainwater harvesting, downspout disconnection
Pervious Pavement	pervious pavers, pervious concrete, pervious alley, porous pavement, porous walkway, permeable walkways, permeable driveway, impervious reduction or removal, decompacted soils, structural soil
Green Roofs	green roof
Bioretention Systems	rain garden, bumpout, biofilter/biofiltration, bioswale, composting facility, conservation landscaping, tree planting, treewells, landuse change from turf to meadow, turf to meadow (native plant habitat), native meadow, native plantings, lawn for reduced chemical input, wet pond or stormwater wetlands
Septic Systems	septic system

The overall distribution of BMP types for modeled INSR projects is shown in Table C-8 and by project in Table C-9.

TABLE C-8. Summary of BMP Types

BMP Type	BMP category	Total Acre-equivalents in modeled INSR grants	% within own BMP Type by acre-equivalents	% of all BMPs by acre-equivalents	Number of HUC12s where implemented ^a	% within own BMP Type by number of HUC12s ^a	% of all BMPs by number of HUC12s ^a	Average Acres/HUC12 where implemented ^a
AG	Livestock exclusion	284	0.21	0.21	83	41.1	34.7	3
AG	Grass riparian buffer	7521	5.58	5.53	76	37.6	31.8	99
AG	Nutrient management	45272	33.61	33.31	26	12.9	10.9	1741
AG	Critical area stabilization	27	0.02	0.02	1	0.5	0.4	27
AG	Cover crops	9302	6.91	6.84	11	5.4	4.6	846
AG	Pasture management	3726	2.77	2.74	112	55.4	46.9	33
AG	Conservation tillage	7217	5.36	5.31	11	5.4	4.6	656
AG	Conservation plan	61012	45.38	44.98	53	26.2	22.2	1151
AG	Wetland restoration	81	0.06	0.06	56	27.7	23.4	1
FOREST	Forested riparian buffer	100	17.59	0.07	3	30.0	1.3	33
FOREST	Cropland conversion to forest	46	8.12	0.03	1	10.0	0.4	46
FOREST	Forest harvest management	151	26.64	0.11	1	10.0	0.4	151
FOREST	Stream restoration	270	47.66	0.20	6	60.0	2.5	45
URBAN	Rain barrel	30	4.73	0.02	20	57.1	8.4	2

URBAN	Pervious pavement	100	15.58	0.07	21	60.0	8.8	5
URBAN	Green roof	1	0.12	0.00	8	22.9	3.3	0
URBAN	Bioretention systems	443	68.98	0.33	29	82.9	12.1	15
URBAN	Septic system	68	10.59	0.05	6	17.1	2.5	11
	Total AG	134441		99.11	202		84.52	564
	Total FOREST	567		0.42	10		4.18	2
	Total URBAN	642		0.47	35		14.64	3
	Total all BMPs	135925			239			569

^aMay be multiple BMP Types and Categories in a single HUC12 so categories are not mutually exclusive.

TABLE C-9. Average acres BMPs by category and modeled project(s)

Project by BMP type	State	AG	AG	AG	AG	AG	AG	AG	AG	AG	FOR	FOR	FOR	FOR	URB	URB	URB	URB	URB		
		Livestock exclusion	Grass riparian buffer	Nutrient management	Critical area stabilization	Cover crops	Pasture management	Conservation tillage	Conservation plan	Wetland restoration	Forested riparian buffer	Cropland conversion to forest harvest management	Stream restoration	Rain barrel	Pervious pavement	Green roof	Bioretention Systems	Septic system			
AG&FOREST: MG10	PA	4.60	80.8	761	26.6	7519	45	2091						151							
AG&FOREST: MG12	PA									0.43											
AG&URBAN: MG12	PA					178		513									0.17				
AG&URBAN: MG25	VA		9.90	1695											0.28	0.48			0.48		
AG: MG01	NY & PA	2.38	6.80				15				1.52										
AG: MG05	PA	1.29	1.50						2340												
AG: MG09	PA						43														
AG: MG09 & MG16	PA			1784			43														
AG: MG12	PA	0.50				178		513													
AG: MG16	PA & VA			1784																	
AG: MG16 & MG28	VA		1759	1784																	
AG: MG17 & MG18	VA	18.9							550												
AG: MG17, MG18 & MG19	VA	9.44							904												
AG: MG18	VA								440												
AG: MG18 & MG19	VA								858												
AG: MG18, MG19 & MG28	VA								1362												
AG: MG19	VA								354												
AG: MG19 & MG28	VA								1087												
AG: MG28	VA								1520												
AG: MG30	MD	4.90					122														
AG: MG34	VA, MD, PA, WV	4.21	3.61				40			0.97											
FOREST: MG03	NY												57								
FOREST: MG31 & MG34	MD										7	46							5		
URBAN&FOREST: MG07	VA												2.40	0.83	2.30	0.02					
URBAN&FOREST: MG27	VA										2				3.13		0.37	51			
URBAN&FOREST: MG29	PA										91				0.11	1.39		14			
URBAN: MG02	PA																			3.68	
URBAN: MG04	VA															0.50	0.10			0.63	
URBAN: MG06	VA														0.20	0.13				0.53	
URBAN: MG08	DC															0.82				0.38	
URBAN: MG11	MD														3.38	1.09				2.04	
URBAN: MG13	VA																			140	
URBAN: MG14	VA																			60	
URBAN: MG15	VA														1.13	0.09				7.78	
URBAN: MG20	PA															6.75				1.15	
URBAN: MG21	DC & MD															0.68					
URBAN: MG21 & MG22	MD																1.51			1.00	
URBAN: MG23	MD															0.82				6.16	11
URBAN: MG24	MD														6.07	0.22				0.06	
URBAN: MG26	PA															82					
URBAN: MG32	MD														1.39	0.09	0.05			0.27	
URBAN: MG33	DC																			0.16	

QUALITY ASSURANCE

BayFAST model inputs and outputs, compiled in Excel spreadsheets, were evaluated for quality control (QC) and checked against scenario inputs entered into, and outputs and resulting from, the web-accessible model itself and against information in the INSR grantee reports. QC activities included consistency checks and associated corrections for:

1. INPUTS:

- Reported data and calculations of full suite of modeled BMP types and magnitudes for grant/HUC12 combinations, including BMP units (e.g., acres vs. counts, etc.)
- Acres per project, per HUC12s where projects implemented, and total acres of BMPs reported in input spreadsheet compared to acres of BMPs in web-based model input
- Identification and location of HUC12s, and exclusion of double-counted BMP/HUC12 combinations
- Labelling of grant combinations, types and subcategories of BMPs (cross-verification between different ways of referring to BMPs in grantee reports, BayFAST, and input spreadsheets), and modeled BMP acreages as actual or estimated (cross-referenced with original grantee reports)

2. OUTPUTS:

- Nitrogen, phosphorus, and sediment baseline and post-BMP mass loadings from web-based model output and outputs spreadsheet
- Cross-check of negative phosphorus and sediment mass loadings from web-based model output and output spreadsheet, and check with BayFAST model developers

RESULTS SUMMARY

INSR Projects Overall

Nitrogen, phosphorus, and sediment load reductions were assessed as total sum mass reductions across all HUC12 subwatersheds for a given project and average reductions per acre-equivalent BMP implemented per project or project combinations. BayFAST output reported pounds of nitrogen, phosphorus, and sediment delivered to the Chesapeake Bay from a specified HUC12 under a specified set of BMPs. Each HUC12 could also be modeled in BayFAST assuming no BMPs, which estimates baseline mass delivery for that HUC12 in the pre-BMP condition. Load reductions for each HUC12/project combination were then calculated as the difference in mass nitrogen, phosphorus, or sediment delivery to the Chesapeake Bay pre- and post-BMP implementation. Percent load reductions were calculated as a mass fraction of pre-BMP load delivered. Some HUC12s contain BMPs from multiple INSR projects and, as such, are reported together. Load reductions were compared between BMP types and between projects (grant numbers) or groups of projects (multiple grant numbers implemented in the same HUC12).

Table C-10 shows total effort of BMPs (in acre-equivalents) and total sum load reductions by broad BMP type (agricultural, forest, or urban, or combinations of multiple types in a HUC12). Collectively, combined estimated load reductions from the modeled INSR projects are approximately 370,000 lbs. nitrogen, 15,000 lbs. phosphorus, and 16,000,000 lbs. sediment, which account for 0.70%, 0.55%, and 0.79% reductions of total pre-BMP loads, respectively.

In Table C-10, the highest two values in a column are colored green and the lowest two values in a column are colored red to be able to compare BMP effort and subsequent reductions across nutrients and sediment and between BMP categories. Agricultural BMPs tend to produce the greatest total load reductions, except for high phosphorus load reductions from some urban projects.

TABLE C-10. Total Sum Reductions by BMP Type

BMP type	Number of HUC12s per BMP type	BMPs (acre-equivalents)	Nitrogen reduction (lbs.)	Nitrogen reduction (%)	Phosphorus reduction (lbs.)	Phosphorus reduction (%)	Sediment reduction (lbs.)	Sediment reduction (%)
							top	2
							bottom	2
AG	198	121516	322542	0.72	12685	0.58	14330540	0.84
AG&FOREST	2	10719	34955	2.96	300	1.35	655365	3.92
AG&URBAN	2	2397	5387	2.29	401	3.24	244068	4.58
FOREST	5	286	784	0.35	615	3.18	422554	2.91
URBAN	29	562	3513	0.06	705	0.17	353711	0.12
URBAN&FOREST	3	169	1889	0.22	202	0.31	120826	0.44
Overall total reductions	239	135650	369071	0.70	14908	0.55	16127065	0.79

These same general patterns between BMP types can be seen on a project basis. Table 11 shows projects sorted by total effort of BMPs in acre-equivalents, along with the BMP category with the most acres and the number of BMP categories involved in a project/HUC12 combination. Multiple projects implemented in the same HUC12 are evaluated together. Projects with agricultural BMPs tend to have greater total mass load reductions than projects with urban BMPs. Table 12 shows total reductions per project separated by endpoint, and sorted by average rank across endpoints. The top five values in a column are colored green and the bottom five values are colored red. While there is some variation in which projects produce which kinds of reductions (e.g., atypically high reductions for urban project MG14, composed of a bioswale, biofilters and stormwater wetlands), greatest total load reductions (green) tend to occur for agricultural projects while smallest load reductions (red) tend to occur for urban projects.

TABLE C-11. Project summary and total BMP effort and categories (sorted by BMP effort)

Project by BMP type	Number of HUC12s per project	State	Total effort of BMPs (acre-equivalents)	BMP category with most acre-equivalents	Number of BMP categories per project
AG: MG28	16	VA	24316	Conservation plan	1
AG: MG16	11	PA, VA	19624	Nutrient management	1
AG: MG09 & MG16	9	PA	16444	Nutrient management	2
AG: MG05	7	PA	16400	Conservation plan	3
AG: MG16 & MG28	4	VA	14172	Nutrient management	2
AG&FOREST: MG10	1	PA	10679	Cover crops	8
AG: MG12	9	PA	6219	Conservation tillage	3
AG: MG19 & MG28	5	VA	5435	Conservation plan	1
AG: MG18 & MG19	6	VA	5149	Conservation plan	1
AG: MG18	10	VA	4400	Conservation plan	1
AG: MG17 & MG18	3	VA	1707	Conservation plan	2
AG&URBAN: MG25	1	VA	1706	Nutrient management	5
AG: MG09	34	PA	1466	Pasture management	1
AG: MG19	4	VA	1416	Conservation plan	1
AG: MG18, MG19 & MG28	1	VA	1362	Conservation plan	1
AG: MG01	49	NY, PA	1267	Pasture management	4
AG: MG17, MG18 & MG19	1	VA	913	Conservation plan	2
AG: MG34	25	VA,MD,P A,WV	720	Pasture management	4
AG&URBAN: MG12	1	PA	691	Conservation tillage	3
AG: MG30	4	MD	507	Pasture management	2
FOREST: MG03	4	NY	228	Stream restoration	1

Project by BMP type	Number of HUC12s per project	State	Total effort of BMPs (acre-equivalents)	BMP category with most acre-equivalents	Number of BMP categories per project
URBAN: MG14	3	VA	181	Bioretention systems	1
URBAN: MG13	1	VA	140	Bioretention systems	1
URBAN&FOREST: MG29	1	PA	106	Bioretention systems	4
URBAN: MG23	6	MD	104	Septic system	3
URBAN: MG26	1	PA	82	Pervious pavement	1
FOREST: MG31 & MG34	1	MD	58	Forest harvest management	3
URBAN&FOREST: MG27	1	VA	57	Bioretention systems	4
AG&FOREST: MG12	1	PA	40	Stream restoration	2
URBAN: MG11	2	MD	13	Rain barrel	3
URBAN: MG32	5	MD	9	Rain barrel	4
URBAN: MG15	1	VA	9.0	Bioretention systems	3
URBAN: MG20	1	PA	7.9	Pervious pavement	2
URBAN: MG24	1	MD	6.4	Rain barrel	3
URBAN&FOREST: MG07	1	VA	6	Stream restoration	4
URBAN: MG02	1	PA	3.7	Bioretention systems	1
URBAN: MG21 & MG22	1	MD	3	Pervious pavement	2
URBAN: MG21	2	DC, MD	1.4	Pervious pavement	1
URBAN: MG04	1	VA	1.2	Bioretention systems	3
URBAN: MG08	1	DC	1.2	Pervious pavement	2
URBAN: MG06	1	VA	0.9	Bioretention systems	3
URBAN: MG33	1	DC	0.2	Bioretention systems	1

Legend
AG project
URBAN project
FOREST project
MULTIPLE CATEGORY project

TABLE C-12. Total reductions by project (sorted by average rank across all nutrient and sediment reductions)

Project by BMP type	Nitrogen reduction (lbs.)	Nitrogen reduction (%)	Phosphorus reduction (lbs.)	Phosphorus reduction (%)	Sediment reduction (lbs.)	Sediment reduction (%)
AG: MG28	25553	1.34	3235	1.87	1946207	2.21
AG: MG16 & MG28	25017	4.89	1323	6.39	293553	4.94
AG&FOREST: MG10	34730	5.28	195	2.37	585027	12.97
AG: MG12	20186	1.33	582	0.99	1486828	4.29
AG: MG05	25086	0.56	1127	0.37	5854943	2.42
AG: MG17 & MG18	4625	1.64	738	1.41	716767	2.06
FOREST: MG03	408	0.40	594	5.23	397667	10.61
AG: MG34	42276	0.59	1406	0.29	811109	0.22
AG&URBAN: MG12	2362	1.71	56	1.25	239362	6.01
AG: MG19 & MG28	8572	0.29	292	0.30	628313	0.97
AG: MG09 & MG16	73635	1.78	543	0.30	211655	0.14
URBAN: MG14	1124	0.59	445	1.17	182831	1.25
AG: MG01	8310	0.34	486	0.33	249500	0.28
AG&URBAN: MG25	3025	3.12	345	4.36	4707	0.35
AG: MG18 & MG19	2975	0.25	257	0.33	560432	0.78
AG: MG17, MG18 & MG19	246	0.53	131	0.78	213502	2.22
AG: MG16	58365	3.26	1978	2.12	0	0.00
AG: MG18	4322	0.16	201	0.13	495105	0.45
AG: MG18, MG19 & MG28	583	0.49	75	0.25	149787	1.91
URBAN&FOREST: MG07	23	0.10	104	1.27	98460	1.03
AG: MG09	19290	0.20	89	0.04	393436	0.19
URBAN: MG26	991	0.13	167	0.31	67986	0.28
AG:MG19	2446	0.10	75	0.11	223934	0.48

Project by BMP type	Nitrogen reduction (lbs.)	Nitrogen reduction (%)	Phosphorus reduction (lbs.)	Phosphorus reduction (%)	Sediment reduction (lbs.)	Sediment reduction (%)
AG&FOREST: MG12	225	0.04	105	0.75	70339	0.58
AG: MG30	1056	0.09	146	0.28	95469	0.17
URBAN&FOREST: MG29	1715	0.25	79	0.18	15943	0.12
FOREST: MG31 & MG34	376	0.30	21	0.26	24888	0.23
URBAN: MG13	189	0.09	29	0.20	54323	0.24
URBAN&FOREST: MG27	152	0.11	19	0.13	6423	0.14
URBAN: MG23	603	0.05	10	0.01	6859	0.02
URBAN: MG11	29	0.01	7	0.04	8724	0.04
URBAN: MG24	19	0.02	8	0.06	3956	0.06
URBAN: MG20	97	0.01	15	0.03	6005	0.02
URBAN: MG02	384	0.15	9	0.04	0	0.00
URBAN: MG21 & MG22	22	0.01	2	0.03	9439	0.03
URBAN: MG32	21	0.00	7	0.01	10305	0.01
URBAN: MG15	16	0.01	3	0.02	1650	0.02
URBAN: MG08	4	0.01	0	0.02	643	0.02
URBAN: MG21	7	0.00	1	0.01	608	0.01
URBAN: MG04	5	0.00	1	0.01	235	0.01
URBAN: MG06	2	0.00	0	0.00	133	0.00
URBAN: MG33	0	0.00	0	0.00	15	0.00
Total Sum Across Projects	369071	0.70	14802	0.55	16127065	0.79

Legend	
top	5
bottom	5

AG project
URBAN project
FOREST project
MULTIPLE CATEGORY project

NFWF Targeted Areas

Load reductions were compared between HUC12 watersheds in NFWF targeted areas and outside NFWF targeted areas. Figure C-7 shows locations of modeled INSR projects within NFWF targeted areas in light green and modeled INSR projects outside of NFWF targeted areas in dark green. Load reductions estimated for these two groups are compared in Figures C-8 through C-10.

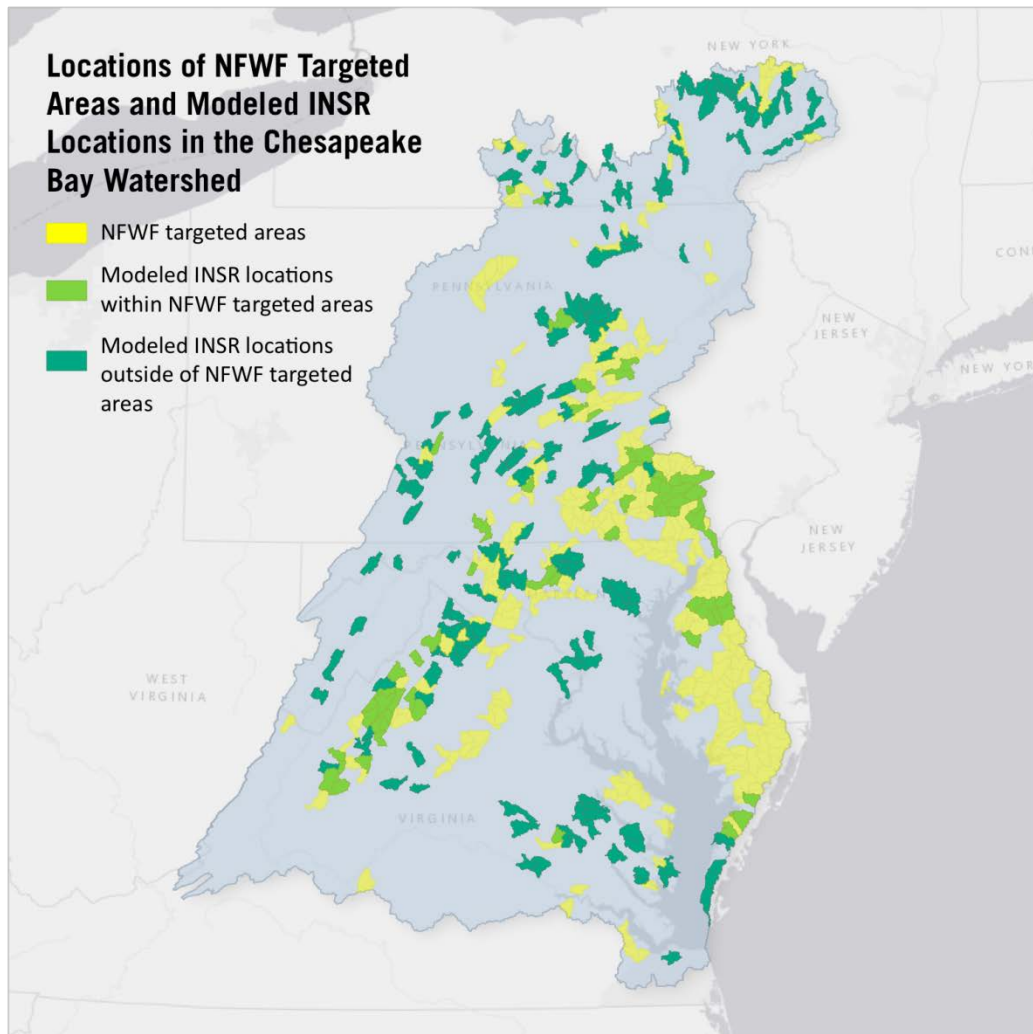


FIGURE C-7. Locations of NFWF targeted areas and modeled INSR locations

Figure C-8 shows that, for urban BMPs, targeted watersheds have greater median nitrogen total load reductions and load reductions per BMP acre-equivalent compared to non-targeted watersheds, but distributions are similar between target and non-target watersheds for agricultural BMPs. Figure C-9 shows that, for phosphorus, there was little difference between reductions modeled in target versus non-target watersheds, although median load reduction per BMP effort is slightly lower in target

watersheds for urban BMPs. Finally, Figure C-10 shows that targeted watersheds have lower median sediment reductions for urban BMPs, but slightly higher or similar reductions for agricultural BMPs.

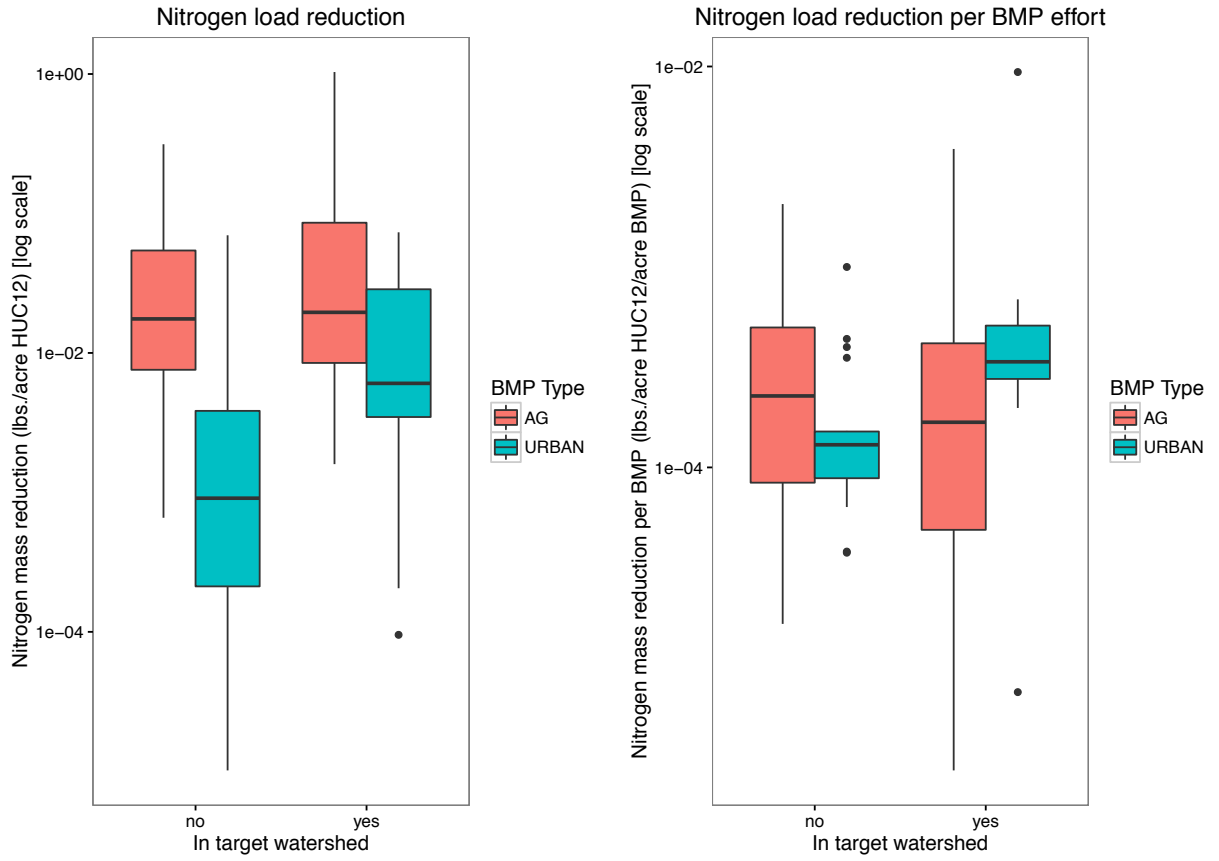


FIGURE C-8. Total and average nitrogen load reductions

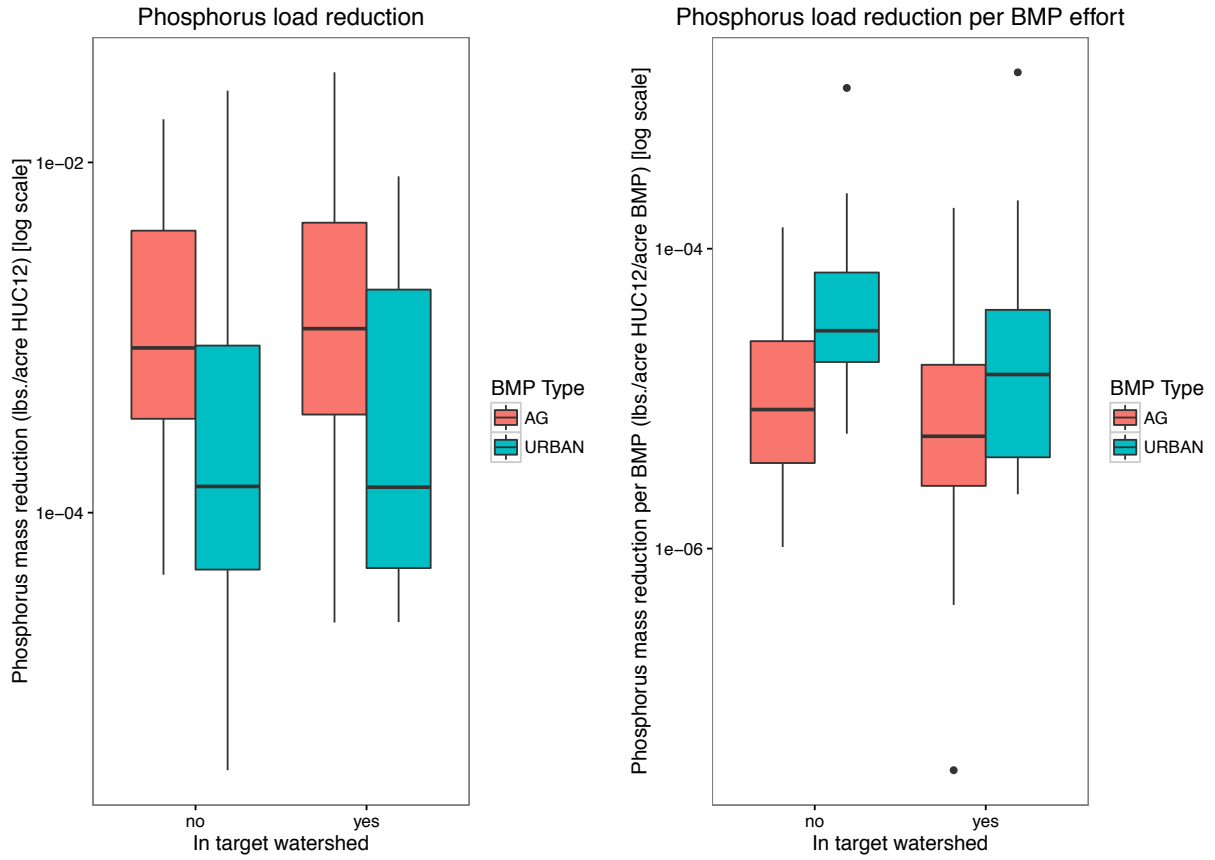


FIGURE C-9. Total and average phosphorus load reductions

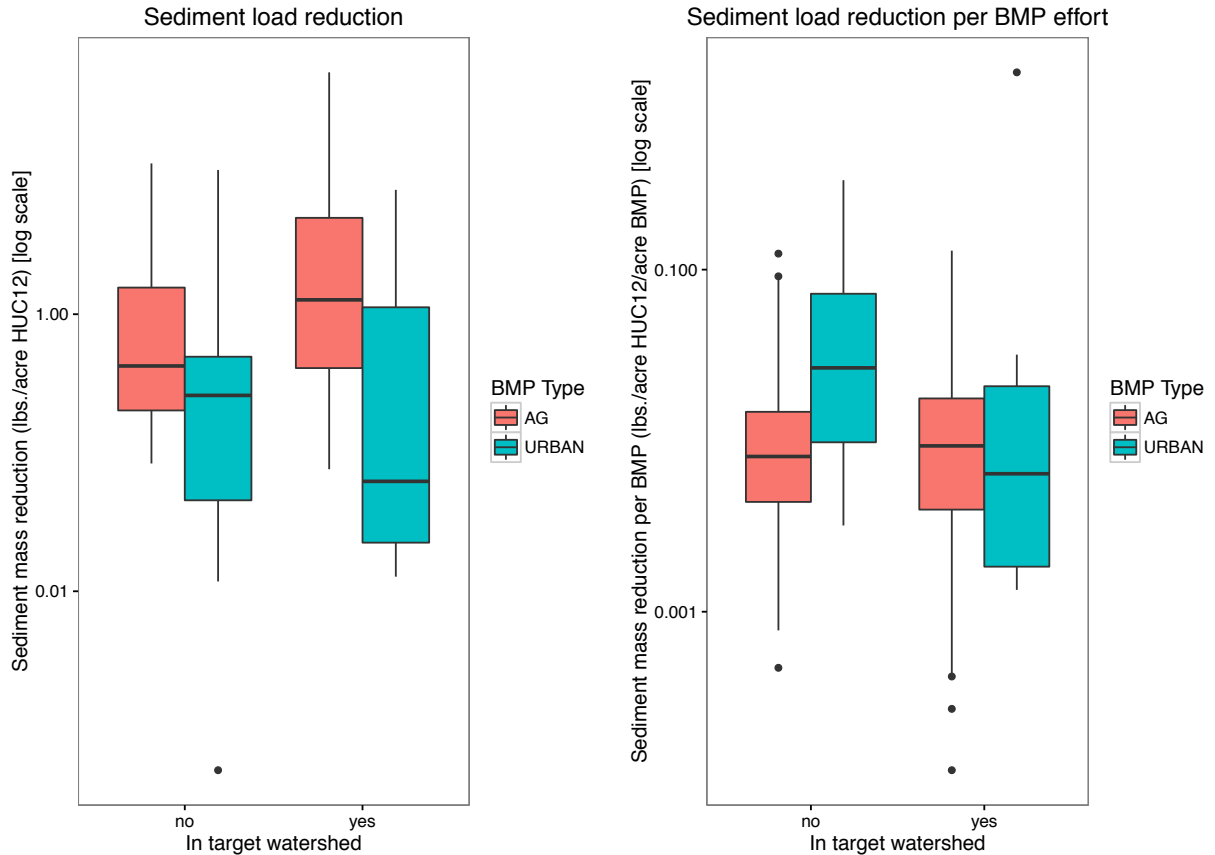


FIGURE C-10. Total and average sediment load reductions

Because most INSR projects contained a variety of specific kinds of BMPs within a single project, it is not possible to disaggregate the influence of specific BMPs on load reductions. Qualitatively, however, projects responsible for the top five highest-achieving estimated nutrient and sediment load reductions included pasture management, soil and water conservation plans, and nutrient management for nitrogen and phosphorus reductions and conservation tillage for sediment reductions. All five projects were agricultural BMPs except for project MG10 in Conewago Watershed of Pennsylvania which also contained cropland conversion to forest.

Overall, there is no clear, consistent effect of targeted areas on load reductions, but this could be due to the variety of other factors that may differ between targeted and untargeted areas. Physiographic and hydrogeomorphic characteristics of watersheds, along with land use types and amounts and types of BMPs implemented all affect load reductions. By aggregating data across all targeted and untargeted areas by BMP category, it is assumed that all other characteristics that affect loading are randomly distributed within a BMP category but this may not be the case. This analysis demonstrates that any systematic improvement from targeting, if it exists, is smaller than the variations in load reductions attributable to other factors. That variation would need to be explained, for example, by matching watersheds on physiographic and hydrogeomorphic characteristics prior to comparison, before any effect of targeting could be isolated.

Methodological and scientific factors preclude a determination of any synergistic effects or other effects on water quality from clustering projects in targeted subwatersheds or other geographic locations. There are methodological issues with using the BayFAST model to answer this question, as well as scientific constraints with setting up appropriate comparison watersheds.

Model-wise, because grants were modeled at the HUC12 watershed scale, results between watersheds are not related to each other. Therefore, modeled reductions from projects in adjacent watersheds will not affect results in a modeled watershed. As such, modeled reductions from projects in adjacent watershed are additive, by definition, as a limitation of the scale of this modeling exercise. Within a watershed, reductions from different land use types are additive and from the same land use type are the opposite of synergistic (the whole is smaller than the sum of the parts) as a function of BayFAST's algorithmic choices.

Scientifically, when the same project is implemented in a different watershed, the results are dependent on the type of project *and* the characteristics of the watershed. Watersheds are not exchangeable, so when two projects are compared in adjacent watersheds with those same two projects in non-adjacent watersheds, the results are not directly comparable not only because distance between watersheds changes, but also characteristics of the watershed change so the watersheds are not comparable. Therefore, any observed differences in load reductions cannot be ascribable to just spatial distance between watersheds, i.e., clustering. To implement a study evaluating the effect of clustering, compared watersheds must be matched on other vital characteristics that affect load reductions (i.e., physical and hydrological factors). If these other factors are not controlled, the study will not show the effect of clustering so much as the fact that reductions differ for the same project applied to different watersheds.

Load Reductions Separated by Grant

To separate the effects of multiple grants implemented in the same HUC12, an additional 33 model runs were conducted parsing previously modeled BMPs by grant (and double-counting HUC12 watersheds). Table C-14 summarizes BMP types and locations by grant for the 272 separately modeled grant/HUC12 combinations. Table 15 summarizes average load reductions for grants modeled separately, with the five greatest values in each column highlighted in green and the five smallest values highlighted in red.

TABLE C-14. Summary of grants modeled separately

Grant	BMP Type	BMP subcategory with most average BMP acres	Total subcategories of BMPs in the grant	State	Number of HUC12s
MG01	AG	Pasture management	4	NY & PA	49
MG02	URBAN	Bioretention systems	1	PA	1
MG03	FOREST	Stream restoration	1	NY	4
MG04	URBAN	Bioretention systems	3	VA	1
MG05	AG	Conservation plan	3	PA	7
MG06	URBAN	Bioretention systems	3	VA	1
MG07	URBAN&FOREST	Stream restoration	4	VA	1
MG08	URBAN	Pervious pavement	2	DC	1
MG09	AG	Pasture management	1	PA	43
MG10	AG&FOREST	Cover crops	8	PA	1
MG11	URBAN	Rain barrel	3	MD	2
MG12	ALL	Conservation tillage	6	PA	11
MG13	URBAN	Bioretention systems	1	VA	1
MG14	URBAN	Bioretention systems	1	VA	3
MG15	URBAN	Bioretention systems	3	VA	1
MG16	AG	Nutrient management	1	PA & VA	24
MG17	AG	Stream access control	1	VA	4
MG18	AG	Conservation plan	1	VA	21
MG19	AG	Conservation plan	1	VA	17
MG20	URBAN	Pervious pavement	2	PA	1
MG21	URBAN	Pervious pavement	1	DC & MD	3
MG22	URBAN	Pervious pavement	1	MD	1

Grant	BMP Type	BMP subcategory with most average BMP acres	Total subcategories of BMPs in the grant	State	Number of HUC12s
MG23	URBAN	Septic system	3	MD	6
MG24	URBAN	Rain barrel	3	MD	1
MG25	AG&URBAN	Nutrient management	5	VA	1
MG26	URBAN	Pervious pavement	1	PA	1
MG27	URBAN&FOREST	Bioretention systems	4	VA	1
MG28	AG	Grass riparian buffer	2	VA	26
MG29	URBAN&FOREST	Forest riparian buffer	4	PA	1
MG30	AG	Pasture management	2	MD	4
MG31	FOREST	Cropland to forest	2	MD	1
MG32	URBAN	Rain barrel	4	MD	5
MG33	URBAN	Bioretention systems	1	DC	1
MG34	AG&FOREST	Pasture management	6	VA, MD, PA, WV	26

Legend
AG project
URBAN project
FOREST project
MULTIPLE CATEGORY project

TABLE C-15. Summary of load reductions for grants modeled separately

Grant	Total BMP effort (acres)	Average nitrogen reduction (lbs.)	Average phosphorus reduction (lbs.)	Average sediment reduction (lbs.)	Average percent nitrogen reduction (%)	Average percent phosphorus reduction (%)	Average percent sediment reduction (%)
MG01	1267.1	169.6	9.9	5091.8	0.4113	0.4222	0.3323
MG02	3.7	384.4	8.6	0.0	0.1482	0.0413	0.0000
MG03	227.8	102.1	148.5	99416.6	0.4754	6.5425	11.3868
MG04	1.2	5.3	0.9	234.5	0.0036	0.0066	0.0067
MG05	16399.5	3583.7	161.0	836420.4	0.6145	0.4655	2.6924
MG06	0.9	1.5	0.4	132.9	0.0010	0.0029	0.0038
MG07	5.6	22.6	103.7	98459.8	0.1016	1.2686	1.0261
MG08	1.2	3.7	0.4	643.4	0.0087	0.0196	0.0186
MG09	1853.7	503.0	2.3	14605.5	0.2461	0.0687	0.2979
MG10	10679.0	34730.3	195.2	585026.7	5.2844	2.3655	12.9729
MG11	13.0	14.7	3.7	4361.8	0.0129	0.0350	0.0396
MG12	6950.6	2070.2	67.5	163320.7	1.4640	1.1953	5.1283
MG13	140.0	188.6	29.3	54323.2	0.0898	0.1975	0.2435
MG14	180.5	374.7	148.2	60943.5	0.5539	1.3402	1.0402
MG15	9.0	15.9	3.2	1650.0	0.0096	0.0191	0.0198
MG16	42816.0	6155.8	136.5	0.0	3.2513	2.4904	0.0000
MG17	66.1	1096.6	185.4	125549.2	0.9157	1.0569	1.1676
MG18	9900.0	379.7	22.9	58420.3	0.1390	0.1845	0.5747
MG19	6018.0	513.3	18.3	44417.8	0.1211	0.1625	0.4436
MG20	7.9	96.8	14.8	6004.8	0.0128	0.0277	0.0244
MG21	2.9	4.8	0.5	1173.1	0.0040	0.0091	0.0096
MG22	1.0	14.7	1.8	6528.7	0.0089	0.0213	0.0208

Grant	Total BMP effort (acres)	Average nitrogen reduction (lbs.)	Average phosphorus reduction (lbs.)	Average sediment reduction (lbs.)	Average percent nitrogen reduction (%)	Average percent phosphorus reduction (%)	Average percent sediment reduction (%)
MG23	103.7	100.5	1.7	1143.2	0.0582	0.0167	0.0252
MG24	6.4	19.4	7.7	3955.8	0.0156	0.0564	0.0635
MG25	1706.1	3024.9	344.9	4706.5	3.1173	4.3575	0.3500
MG26	81.7	990.5	167.0	67986.1	0.1312	0.3123	0.2758
MG27	56.7	151.6	19.1	6423.3	0.1054	0.1294	0.1371
MG28	35750.0	1682.8	157.6	105541.1	1.1665	2.1408	4.0778
MG29	106.3	1715.0	79.1	15942.8	0.2515	0.1831	0.1211
MG30	506.6	263.9	36.6	23867.2	0.1772	0.4745	0.4021
MG31	51.0	230.7	13.8	10950.8	0.1855	0.1729	0.1018
MG32	9.0	4.3	1.5	2061.0	0.0040	0.0161	0.0170
MG33	0.2	0.3	0.1	15.1	0.0004	0.0013	0.0006
MG34	727.3	1631.6	54.3	31732.3	0.2896	0.2612	0.2751

Legend	
top	5
bottom	5

Some of the information in Table C-15 is visually represented in Figures C-11 through C-13, which show average percent reduction from baseline compared to acre-equivalents of BMPs implemented. As expected, the greater the BMP effort for a grant, the greater the percent load reductions. And, as shown in modeling efforts to characterize overall reductions, greatest average reductions by project typically result from agricultural and forest BMPs.

For nitrogen (Figure C-11), the project that achieved the greatest average percent reductions was project MG10, which involved 8 different subcategories of forest and agricultural BMPs in one watershed in Lancaster, Dauphin, and Lebanon, Pennsylvania. Other top-ranking projects for nitrogen include nutrient management in 24 watersheds in Pennsylvania and Virginia (project MG16, which also

had the greatest total acres BMPs implemented), and nutrient management in addition to four other subcategories of agricultural and urban BMPs in one watershed in Accomack, Virginia (project MG25, using fewer acres BMP than the other top projects).

For phosphorus (Figure C-12), greatest average percent reductions were achieved from project 1452, stream restoration in four watersheds in New York, using less BMP acres than 12 other projects. Projects MG25 and MG16 also achieved second and third-highest phosphorus reductions, by percent. Greatest average percent reductions for sediment (Figure C-13) resulted from projects MG10 and MG03, as well, with the third-highest reductions produced by project MG12, mostly representing conservation tillage and cover crops in 11 watersheds in Lycoming, Pennsylvania.

While Table C-15 and Figures C-11 through C-13 summarize average reductions per project, Figures C-14 and C-15 show the distributions of load reductions across watersheds within a project, by mass and percent, respectively. These figures show that implementing the same set of BMPs in a variety of watersheds can result in a wide range of different load reductions depending on the characteristics of the watershed selected. Figures C-14 and C-15 also show that, on a per-watershed basis, some specific grant/HUC12 combinations that implemented urban BMPs outperform other specific grant/HUC12 combinations implementing agricultural BMPs. This underlies the complexity of predicting BMP impacts in different watersheds.

Nitrogen Reductions Compared to BMP Acres

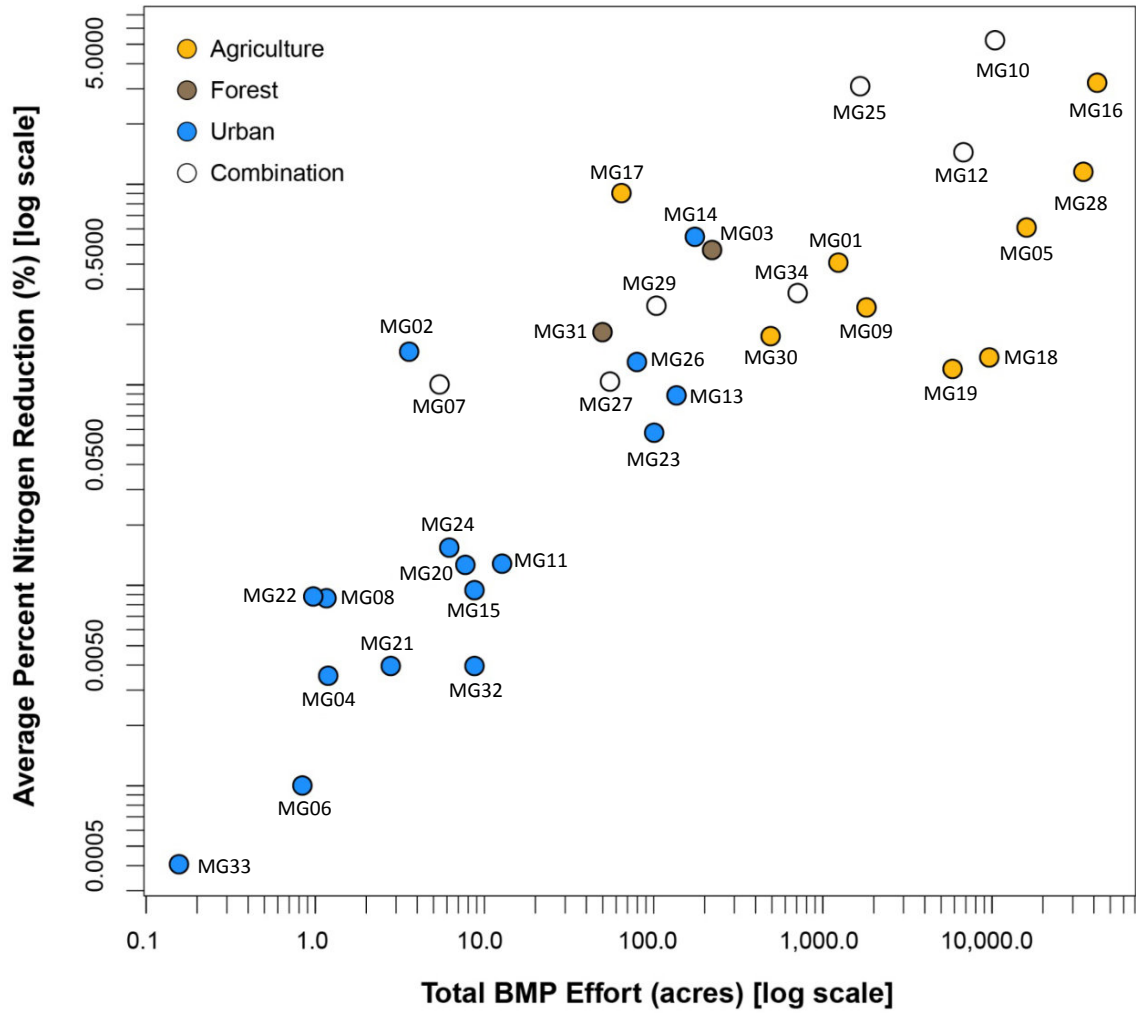


FIGURE C-11. Nitrogen reductions by project

Phosphorus Reductions Compared to BMP Acres

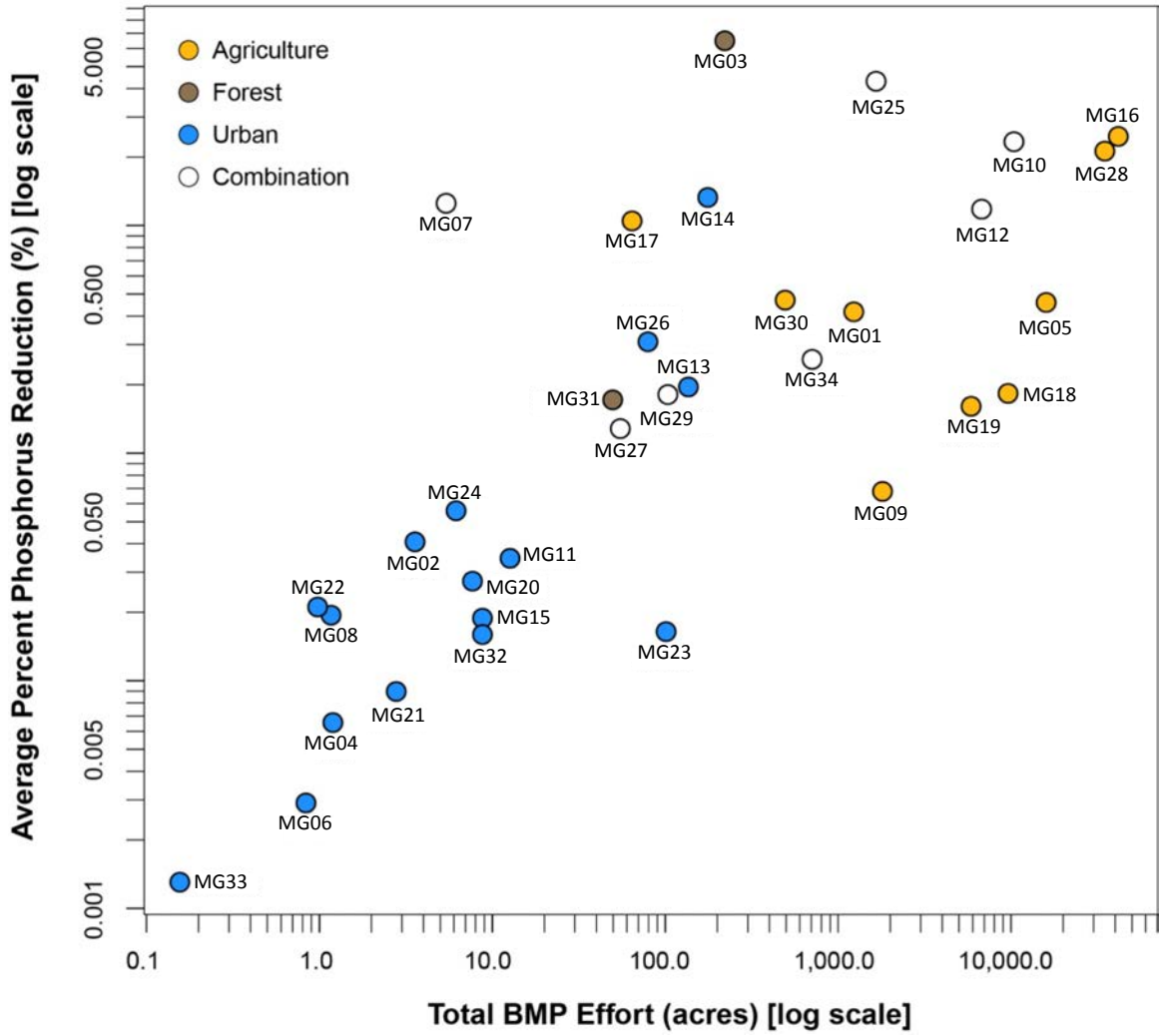


FIGURE C-12. Phosphorus reductions by project

Sediment Reductions Compared to BMP Acres

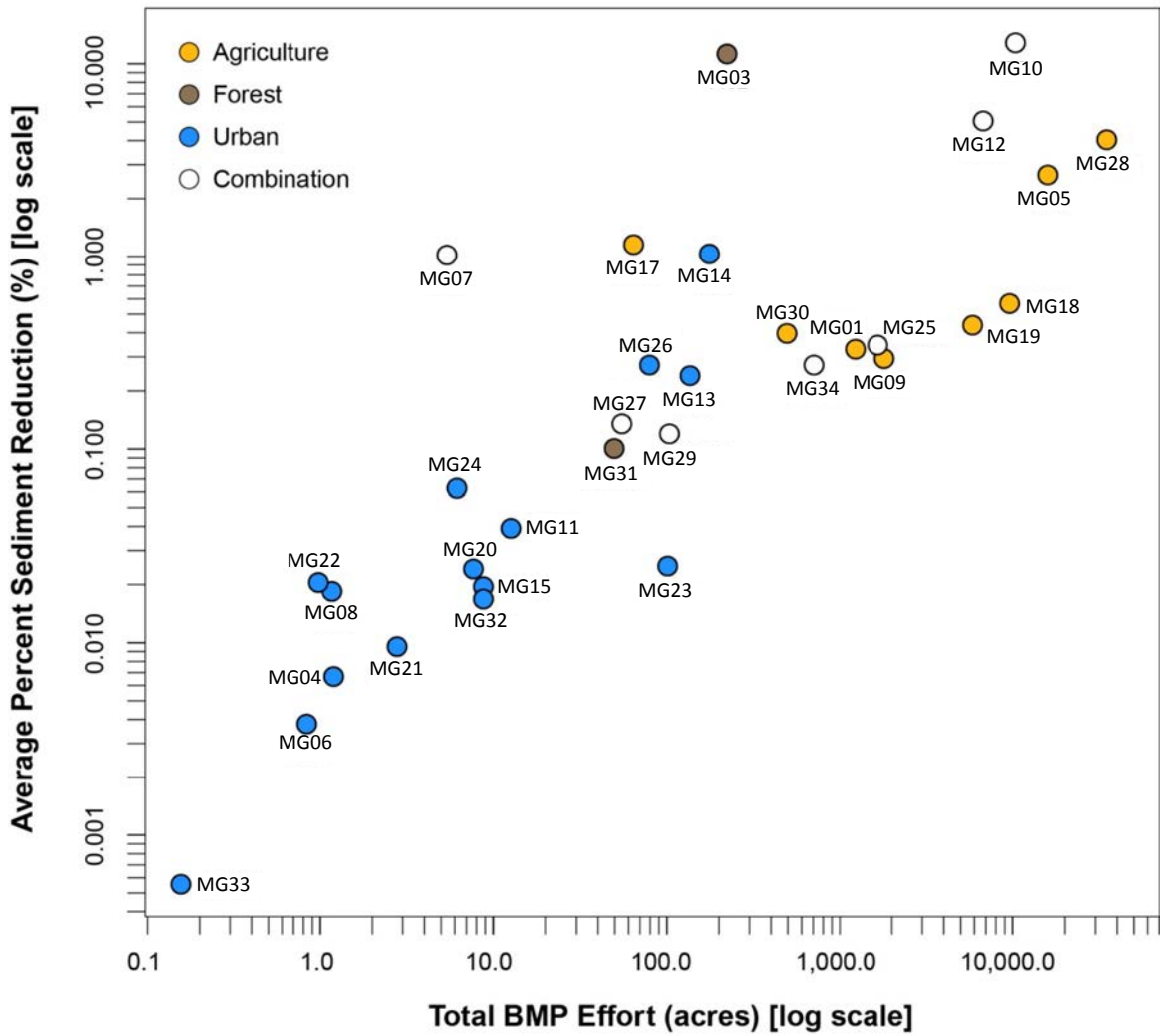


FIGURE C-13. Sediment reductions by project

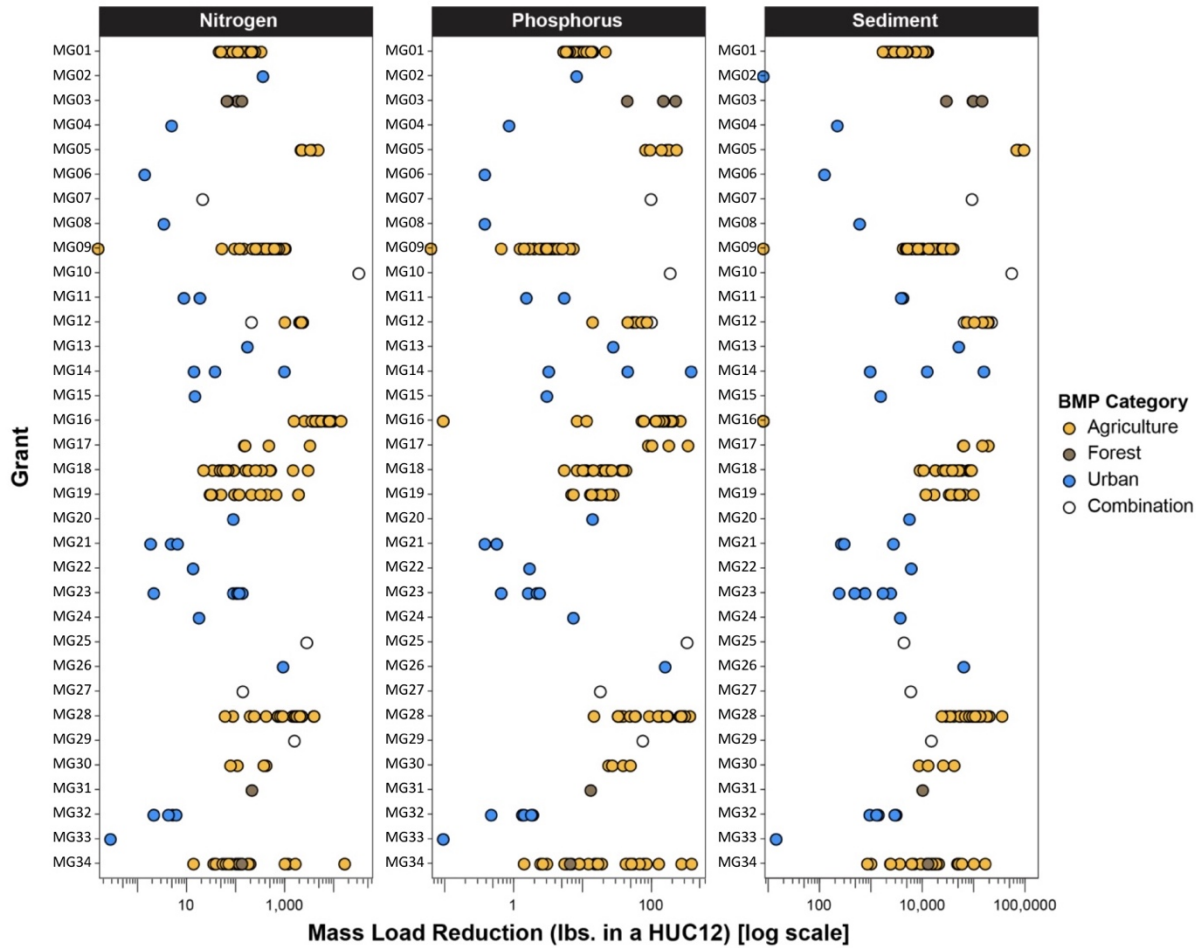


FIGURE C-14. Mass load reductions by project across all watersheds where that project was implemented

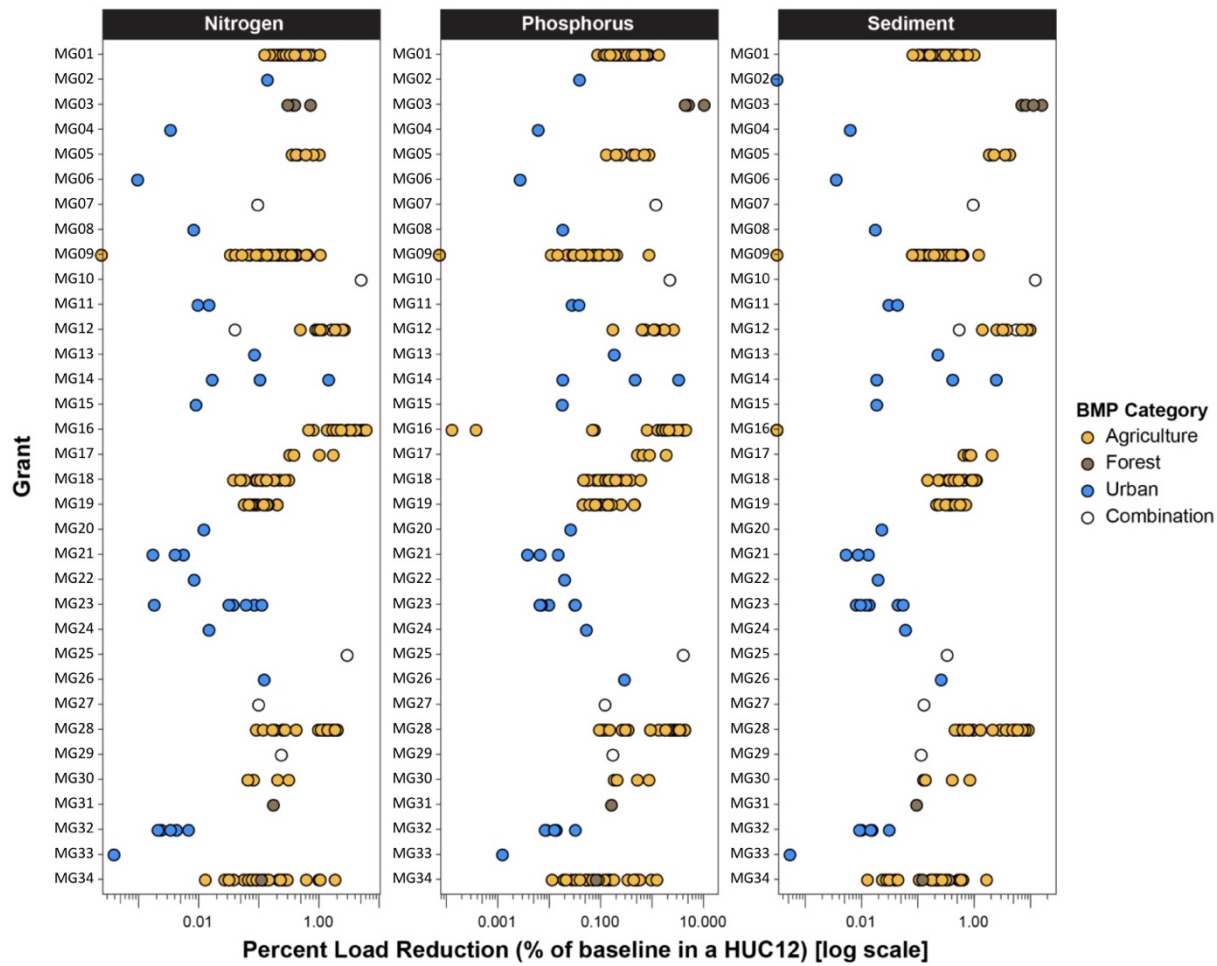


FIGURE C-15. Percent load reductions by project across all watersheds where that project was implemented

ASSUMPTIONS

In addition to the specific assumptions described previously, several global kinds of assumptions were made as part of this modeling effort, specifically:

- That BMPs were implemented correctly with complete fidelity, and that the science is well-vetted such that, if these BMPs are implemented correctly, reductions reported are accurate
- That entire period (2009-2012) is a single time step, and model overall BMPs applied to a HUC12 over that period simultaneously
- That assumptions made by the BayFAST model about data sources and quality, algorithm forms, and how to average across different potential sources of variability

Per discussion with Olivia Devereux, there is known error in BayFAST regression equations estimating load associated with riparian pasture land use. This error may lead to negative phosphorus and sediment load reduction estimates for scenarios affecting grazing in riparian areas, such as the pasture management BMP implemented in grant MG09. It is more likely that calculated negative load reductions are attributable to this error rather than to actual phosphorus or sediment increases because of this BMP. Therefore, the calculated negative load reductions reported in Table C-16 were set to zero change rather than negative change.

TABLE C-16. BayFAST-calculated negative load reductions that were assume to be zero.

Grant type and number	HUC12	County	BayFAST-reported phosphorus load reduction (lbs.)
AG: MG09	20503050306	Perry, PA	-0.6
AG: MG09	20503040901	Huntingdon, PA	-3.9
AG: MG09	20503050402	Cumberland, PA	-0.5
AG: MG09	20503050304	Cumberland, PA	-0.3
AG: MG09	20503010304	Snyder, PA	-5.3, and -11,472.3 (sediment)
AG: MG09	20503010305	Snyder, PA	-5.3, and -11,472.3 (sediment)
AG: MG09	20503020505	Blair, PA	-0.3
AG: MG09	20503020106	Blair, PA	-0.1
AG: MG09	20503020303	Blair, PA	-0.3
AG: MG09 and MG16	20503061204	Lancaster, PA	-40.1
AG: MG09 and MG16	20503061106	Lancaster, PA	-37.6
AG: MG09 and MG16	20503060801	Lancaster, PA	-11.1

UNCERTAINTIES

There are several different classes of uncertainty associated with translating project information available in the INSR grantee reports into inputs appropriate for BayFAST modeling:

- BayFAST is not able to model a specific kind of reported BMP
- BayFAST can model a reported kind of BMP but there is not enough information provided by the grant report to know how to model it at all
- BayFAST can model a reported kind of BMP but there is not enough information provided by the grant report to know how to model it exactly so assumptions are made

For the two first kinds of uncertainties, not modeling a BMP that is part of a suite of BMPs implemented as part of a grant project is likely to systematically underestimate load reductions achieved by that grant. This is the case for the BMPs shown in Table C-17.

TABLE C-17. Unmodeled BMPs that likely underestimate loadings for associated grants (which were modeled for their other reported BMPs)

BMP or Attribute	Reason	Grant number
Ammonium scrubber	BayFAST not able to implement	MG22
Stormwater ordinance	BayFAST not able to implement	MG26
Floating wetlands	BayFAST not able to implement	MG13
Riparian buffer restoration at a park, subsurface drainage installation, rotational grazing, and stone or grass-lined waterway	Not enough information to be able to implement in BayFAST	MG12
73 non-buffer agricultural BMPs of unspecified type	Not enough information to be able to implement in BayFAST	MG05

For grants reporting BMP information at a resolution more coarse than that modeled by BayFAST (for which assumptions were made about HUC12 location and BMP acreage and distribution among HUC12s), error associated with these assumptions likely follows a pattern of random variability centered on zero, and there is no reason to think these assumptions result in a systematic over- or under-estimation of load reductions for those projects (e.g., assuming even distribution of green roofs, impervious removal, and native landscaping for grant MG32; randomly selecting HUC12s in reported counties and evenly distributing BMP acreage among those HUC12s for grants MG09, MG18, MG19, MG28, and MG34). Estimating the magnitude of this variability is a separate exercise.

One set of circumstances for which load reductions may have been overestimated is when it was assumed that grant MG34 implemented BMPs in all HUC12s associated with listed stream names (an upper-end assumption and interpretation). Finally, assuming all reported BMPs were implemented in one HUC12 for grant MG07 may underestimate load reductions if BMPs are overlapping or overestimate if BMPs are assumed spatially synergistic when they were actually distributed across multiple HUC12s.

Uncertainties associated with the BayFAST model include accuracy of land cover information (spatial distribution and matching to implemented BMPs in time), and field validation of simulated load reductions. The BayFAST model itself averages across a lot of system variability associated with weather patterns, BMP practice effectiveness, hydrologic processes, and other factors, which has never been comprehensively characterized.²⁵ However, since this variability is consistently treated among model runs, effectively standardizing its influence on output, this model is an appropriate tool for management comparisons.

LIMITATIONS

This analysis is limited by several important restrictions of scope. The INSR evaluation team did not review the BayFAST model code itself, the data and relationships on which the model algorithms are based (including the BMP % load reductions that are the basis of the model), nor the scientific literature that supports model assumptions. A quantitative evaluation of potential sources of error and variability was not conducted.

Large potential sources of error in this assessment are likely the assumptions made in filling in missing information gaps about BMP project implementation (location, size, and distribution) to translate reported information into the input format required by BayFAST. Additionally, the inability to model several innovative strategies using the current version of BayFAST creates a limitation to understanding potential benefits of these strategies compared to more conventional ones.

Evaluation of synergies between BMPs in the same HUC12 is limited by the fact that BayFAST automatically assumes functional relationships between overlapping BMPs and is, therefore, not an independent method of assessing them. Disaggregation of the effect of specific BMPs is limited by the fact that most projects share multiple BMP practices implemented together, which together resulted in modeled load reductions. Also, the effectiveness of a specific BMP practice depends on the characteristics of the watershed in which it was implemented, so effectiveness also depends on watershed hydrology, spatial location, soil types, land uses, etc., which differ between watersheds. As such, it is challenging to evaluate synergy between multiple projects implemented in the same watershed and those same projects implemented in different watersheds, because differences between the HUC12s would contribute to differences in modeled load reductions. Without a characterization of the variability between HUC12s, it is difficult to distinguish differences in load

²⁵ As reported by the BayFAST Water Quality Modeling review panel (Jeff Sweeney, Matt Johnston and Olivia Devereux) on Dec. 7, 2016.

reductions due to BMP practices from differences in load reductions due to watershed factors. While this exercise could be conducted for a specific watershed and group of BMPs, conclusions could not necessarily be extrapolated to other areas surrounding the Chesapeake Bay. This spatial uncertainty would need to be better quantified and understood before BayFAST can be used, in concert with an appropriate study design, to answer questions about synergy more broadly.

CONCLUSIONS AND RECOMMENDATIONS

Load reductions expected to result from implementation of different sets of BMPs are complicated to understand depend on baseline amount of nutrient and sediment loading available for reduction, type of land use in watershed (which affects both baseline loading amount and types of BMPs able to be implemented), and the spatial location of a watershed (which affects soil types, layout of hydrology, hydrologic connection to Chesapeake Bay, etc.). It is difficult to draw simple conclusions about the effectiveness of different BMPs implemented in different locations because all these factors interact and affect load reductions.

Despite the uncertainties and limitations associated with use of the BayFAST model to estimate load reductions for each grant, the model can integrate relevant information about the spatial location of BMP implementation, combined with BMP efficiency, to estimate load reductions and their spatial variability. The model has been specifically developed for and calibrated to the Chesapeake Bay and is consistently used by many stakeholders. As such, BayFAST is an appropriate model to use for this application.

If load reductions are an important goal of the INSR granting process, then collecting data to help estimate projected load reductions should be an important part of the grant selection process. For example, NFWF could require grant applicants to report information about proposed BMPs at the resolution required to be modeled in BayFAST or other selected modeling tool (in terms of location and acreage of BMPs), so that errors are not incurred from making assumptions as to the specifics of BMP implementation. Another type of useful integration of data collection as part of the granting process would be coordinating grant locations with locations of existing water quality monitoring data to have real-world field estimates of load reductions to compare to modeled reductions. Thirdly, proposed projects could be triaged based on factors that would lead to greatest load reductions (e.g., magnitude of baseline nutrient and sediment loads).

APPENDIX D

INSR-Funded Innovations: Effectiveness and Innovation Assessment

Sector	INSR-Funded Innovations	New or experimental approach	Improvement to existing practice	# Projects Evaluated ¹	Technical effectiveness ²	Cost-effectiveness ³	Transferability ⁴
Agriculture	1. Continuous improvement plans to promote regulatory compliance and increasing farm-scale nutrient balance over time	--	✓	2/7	Moderate	Mixed	✓
	2. Farmer-to-farmer mentor programs to increase agricultural BMP adoption	--	✓	3/3	Moderate - High	Moderate - High	✓
	3. Increasing agricultural BMP adoption/implementation by connecting water quality improvements to food system sustainability and supply chains	--	✓	1/2	High	Moderate	✓
	4. Increasing agricultural BMP adoption/implementation by engaging absentee landowners and embedding agricultural BMPs into conservation easements	--	✓	1/2	Low - Moderate	Not able to determine	Uncertain
	5. Increasing BMP adoption by promoting benefits to recreationally-important species	--	✓	1/5	Low	Not able to determine	Uncertain
	6. Multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems	--	✓	1/11	Moderate	Not able to determine	✓

¹ # indicates completed INSR projects available and assessed out of total INSR projects, including active projects, in this innovation category.

² Technical effectiveness ranked across projects assessed for the innovation; Mixed = divergent results at the project level for that category.

³ Cost-effectiveness of the innovative practices or approaches, where information was available from project final reports. 'Not able to determine' indicates project report did not contain enough information to assess.

⁴ Transferability: check mark indicates general ability to transfer or apply the innovation elsewhere in the watershed; Mixed = divergent results between projects in the category; Uncertain = Information from project indicates uncertainty about ability to widely apply the innovation elsewhere; Limited = innovation is not broadly applicable across the watershed.

Agriculture	7. New combinations of new and existing programs to increase conservation on Plain Sect farms	--	✓	1/1	High	High	✓
	8. Use of adaptive management tools to improve land retirement programs	--	✓	1/1	High	Low	✓
	9. Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes	✓	--	1/1	High	High	✓
	10. Use of innovative technologies to manage excess manure nutrients and/or ammonia emissions from animal production	✓	--	2/3	Mixed	Mixed	Mixed
	11. Use of novel manure injection technologies for subsurface application of dry poultry and/or dairy manures	✓	--	1/2	Low	Moderate	Uncertain
Stormwater	12. Stormwater management using watershed scale approaches and/or increased coordination among local governments	✓	✓	2/10	Moderate – High	Moderate – High	✓
	13. Demonstrate the use of regenerative stormwater conveyance systems	✓	--	1/2	High	Moderate	✓
	14. Expand the capacity of local governments to finance stormwater improvements through public and private funding	✓	✓	3/4	Mixed	Moderate – High	✓
	15. Identifying and addressing barriers to stormwater BMP implementation	--	✓	1/2	High	Mixed	✓
	16. Implementation of intensive training program for stormwater design professionals and local government planners	--	✓	2/2	Moderate - High	Moderate	✓
	17. Increase residential GI adoption using outreach, stormwater audits, and financial incentive programs	--	✓	1/4	Moderate - High	Moderate	✓

Stormwater	18. Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits	--	✓	6/10	Moderate - High	Mixed	✓
	19. Non-traditional partnerships for stormwater management and green infrastructure	--	✓	2/7	Moderate	Not able to determine	✓
	20. Use of Floating Treatment Wetlands as a wetland retrofit	✓	--	1/1	Low	Not able to determine	Limited
	21. Use of subsoiling, sand filters and soil media additives, and biochar to increase performance of stormwater management facilities	✓	--	2/6	Moderate – High	Not able to determine	✓
	22. Use of treatment trains to manage flow and quality of stormwater runoff	✓	✓	1/4	High	High	✓
Habitat Restoration and Forest⁵	23. Converting turf to trees	--	✓	1/2	High	High	✓
	24. Restoration of oyster reefs and measurement of associated nutrient assimilation capacity	✓	--	1/3	High	Not able to determine	Limited
	25. Train volunteer watershed experts in community nutrient and sediment reduction activities	--	✓	1/1	Moderate	Mixed	✓
	26. Use of alternative planting methods and/or volunteers to improve establishment and maintenance of riparian forest buffers	✓	✓	1/2	Mixed	Mixed	✓
	27. Use of decision support, targeting tools, and flexible stands to increase adoption and maximize benefits of forest buffer and riparian restoration	✓	✓	1/4	High	Not able to determine	✓

⁵ For modeling, some habitat restoration BMPs were grouped with agricultural BMPs, and others remained in the separate Forest BMP category. See Appendix C for BMPs by sub-category.

Multi-sector	28. Community-based approaches for nutrient reduction	--	✓	3/6	Mixed	Not able to determine	✓
	29. Market-based trading programs for increased agricultural conservation and stormwater management	✓	✓	3/4	Mixed	Mixed	✓
	30. Watershed-scale effort involving coordination across multiple sectors (i.e., including agricultural and non-agricultural partners)	--	✓	4/6	Moderate – High	Not able to determine	✓

APPENDIX E

ONLINE SURVEY INSTRUMENTS

NFWF INSR Grantee Dissemination Survey 2016

Cover Letter

The National Fish and Wildlife Foundation (NFWF) Chesapeake Bay Stewardship Fund's Innovative Nutrient and Sediment Reduction (INSR) Program is undergoing an evaluation conducted by Dantzker Consulting, LLC and its partners. As you know, the purpose of the INSR grant program is to support efforts within the Chesapeake Bay and its watershed to vastly accelerate nutrient and sediment reductions with innovative, sustainable, and cost-effective approaches. NFWF has awarded more than 100 INSR grants since 2008. A main goal of the INSR program is to actively transfer and disseminate lessons learned from the awarded grant projects to the larger Bay region community. Thus, one of the primary components of the NFWF INSR evaluation is to collect information from both INSR grantees and non-grantees about INSR dissemination activities in order to better understand the effectiveness of these approaches on adoption of innovative reduction technologies throughout the Bay region. Findings from the evaluation will be utilized by NFWF to support current and future INSR grantees to use the most effective vehicles and formats for disseminating information about their innovative approaches to nutrient and sediment reduction.

About the Survey

The survey questions are focused on dissemination and adoption of innovative INSR-funded grant approaches. By INSR-funded approaches, we mean those approaches that specifically were funded by NFWF's INSR grant program between 2008 and today. For the purpose of this survey, we define dissemination as the different modes and formats in which you communicate information about your INSR grant project to other stakeholders in the Bay community.

This survey asks specific questions about many different dissemination activities and formats, as well as a range of possible dissemination audiences. Please note that you are not expected to have disseminated information about your INSR grant project via all of these activities/formats, nor are you expected to have targeted all of the potential audiences. Please select only those that apply to your project. We appreciate your candid responses.

Confidentiality/Informed Consent

Your submission of a completed survey is confirmation that you are 18 years of age or older and that you consent to participate in this study.

Your participation is completely voluntary. You have the right to refuse to answer any question(s) for any reason(s), without penalty. There are minimal risks to you for filling out the survey. The potential benefit of filling out the survey is that you will contribute to a better understanding about the effectiveness of NFWF's INSR grant program and will help NFWF better support the dissemination efforts of current and future INSR grantees.

This survey is confidential (private). Only members of the evaluation team (Dantzker Consulting, LLC and its partners on this evaluation) will have access to the survey data, which will be kept in password protected files in locked offices. For reporting purposes, individual responses will be kept confidential, and any findings from this survey will be reported in aggregate (group) form only.

If you have any questions, concerns, or complaints about this survey, please contact Dr. Heather Dantzker (Principal Investigator) at heather@dantzker.com or by calling (607-592-6040). If you wish to ask questions about your rights as an evaluation participant or to voice any problems or concerns you may have about the study to someone other than the evaluators, please call Solutions IRB at 855-226-4472 and reference IRB ID: 20160703.

Instructions for Submitting a Survey Online

This survey will take between 25 and 35 minutes depending on your answers to some of our questions. Please complete your online survey in one sitting, because you will not be able to return to an incomplete survey. The due date for completing an online survey is Friday, July 22, 2016.

Grantee Information

* 1. Please enter the information below.

Easy Grant #

Your name

Your current title

Your organization

Your E-mail address

Your role on the project

NFWF INSR Grantee Dissemination Survey 2016

Primary approach

This section is intended to gather information about dissemination activities associated with the INSR project identified on the previous page.

* 2. Which of the following best describes the sector associated with your INSR project?

- Agriculture
- Stormwater
- Septics
- Habitat Restoration
- Multisector

NFWF INSR Grantee Dissemination Survey 2016

Agriculture - Primary Approach

* 3. Select the primary INSR approach that your project focused on for dissemination.

- Use of thermochemical conversion to evaluate nutrient reduction potential at one or more poultry farms
- Use of novel manure injection technologies (e.g., 'Subsurfer') for subsurface application of dry poultry and/or dairy manures
- Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes
- Use of on-farm, community-based composting
- Use of ammonia scrubbers and/or litter additives to reduce poultry house nutrient emissions
- Use of agro-forestry practices to increase market-based incentives for land conservation
- Increasing agricultural best management practice adoption/implementation by or use of... (if you choose this option, you will be taken to another page with more specific approaches to choose from)

NFWF INSR Grantee Dissemination Survey 2016

Agriculture: Increasing agricultural BMP adoption/implementation

* 4. Please select your specific approach.

- Increasing agricultural best management practice adoption/implementation by **promoting benefits to recreationally-important species**
- Increasing agricultural best management practice adoption/implementation by **connecting water quality improvements to food system sustainability**
- Increasing agricultural best management practice adoption/implementation by **engaging absentee landowners**
- Increasing agricultural best management practice adoption/implementation by **incorporating agricultural best management practices into conservation easements**
- Increasing agricultural best management practice adoption/implementation by **implementing a farm certification program to increase compliance with conservation and nutrient management requirements**
- Use of continuous improvement plans to promote increasing farm-scale nutrient balance over time
- Use of multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems
- Use of mentor-to-mentor programs to increase prescribed grazing
- Use of combined on-farm and stream corridor practices
- Use of “pay for performance” incentives in public conservation programs to maximize nutrient reductions
- Use of new combinations of new and existing programs to increase conservation on Plain Sect farms
- Use of a watershed-wide farmer network to enable improved nutrient management
- Use of a watershed-scale approach to agricultural nutrient reduction
- Use of trained resource teams and decision support tools to increase nutrient management on agricultural operations
- Use of whole-farm conservation systems
- Use of integrated nutrient reduction programs to promote nutrient reduction strategies
- Use of verified continuous improvement program criteria for ‘reasonable assurance’
- Use of existing farm-community partnerships to manage high-density animal production areas
- Use of market-based trading programs for increased agricultural conservation

NFWF INSR Grantee Dissemination Survey 2016

Stormwater - Primary Approach

* 5. Select the primary INSR approach that your project focused on for dissemination.

- Demonstrate the use of one or more regenerative stormwater conveyance systems
- Use of biochar or water treatment residual additives in bioretention soil media to increase nutrient retention and infiltration rates
- Use of soil media additives to increase nutrient retention in stormwater management facilities
- Use of additives to sand filters in existing stormwater management practices to increase nutrient removal
- Use of agricultural subsoiling and soil amendment practices to increase infiltration in compacted urban soils
- Use of Floating Treatment Wetlands as a wetland retrofit
- Implementation of low impact development and stormwater management practices using public-private partnerships (e.g., privately-financed practices, stormwater trading)
- Use of treatment trains of innovative best management practices to manage flow and quality of stormwater runoff
- Social marketing research: Use of social marketing research to target adoption of behaviors related to residential stormwater management
- Training: Implementation of intensive training program for stormwater design professionals and local government planners
- Stormwater offsets and banking: Development or use of guidelines for implementing a stormwater offset and banking system
- Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits
- Watershed scale stormwater management: Adoption of a watershed scale program or approach for stormwater management
- Financing and capacity building (if you choose this option, you will be taken to another page with more specific approaches to choose from)
- Non-traditional partnerships for stormwater management and green infrastructure (if you choose this option, you will be taken to another page with more specific approaches to choose from)
- Green Infrastructure (if you choose this option, you will be taken to another page with more specific approaches to choose from)
- Identifying and addressing barriers to stormwater best management practice implementation
- Installing a series of connected stormwater best management practices
- Other (please specify)

* 6. Please select your specific approach.

- Financing and capacity building: Private landowner incentive program
- Financing and capacity building: Private financing of urban stormwater retrofits
- Financing and capacity building: Expanding capacity of local government stormwater financing

NFWF INSR Grantee Dissemination Survey 2016

Stormwater - Non-traditional partnerships

* 7. Please select your specific approach.

- Non-traditional partnerships for stormwater management and green infrastructure: **With fire and/or emergency medical services**
- Non-traditional partnerships for stormwater management and green infrastructure: **With houses of worship**
- Non-traditional partnerships for stormwater management and green infrastructure: **With affordable housing authorities**
- Non-traditional partnerships for stormwater management and green infrastructure: **With transportation agencies**
- Non-traditional partnerships for stormwater management and green infrastructure: **With schools**
- Non-traditional partnerships for stormwater management and green infrastructure: **Development of social engagement and urban conservation for stormwater management**
- Non-traditional partnerships for stormwater management and green infrastructure: **Comprehensive community engagement for stormwater management**

NFWF INSR Grantee Dissemination Survey 2016

Stormwater - Green Infrastructure

* 8. Please select your specific approach.

- Green Infrastructure: **Increasing coordination among small, local governments for regional green infrastructure implementation**
- Green Infrastructure: **Increasing residential green infrastructure adoption using outreach and stormwater audits**
- Green Infrastructure: **Increasing green infrastructure with community engagement and municipal staff training**
- Green Infrastructure: **Use of green infrastructure in highly visible, high-traffic locations**
- Green Infrastructure: **Institutionalizing green infrastructure with policy change and establishment of a stormwater utility**

NFWF INSR Grantee Dissemination Survey 2016

Septics - Primary Approach

* 9. Select the primary INSR approach that your project focused on for dissemination.

- Increasing septic system upgrades through creative financial incentives
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Habitat Restoration - Primary Approach

* 10. Select the primary INSR approach that your project focused on for dissemination.

- Restoration of oyster reefs and measurement of associated nutrient assimilation capacity
- Use of alternatives to seedling plantings for forest buffer restoration, including any of the following: natural regeneration, direct seeding, and live staking
- Use of natural stream restoration methods for sediment reduction
- Increasing best management practice adoption by promoting benefits to recreationally-important species
- Use of targeting tools to maximize benefits of forest buffer and riparian restoration
- Use of volunteers for buffer maintenance
- Leveraging emergency disaster response activities of state and/or local agencies to improve stream and floodplain conditions
- Converting turf to trees
- Campaign to increase rural and urban riparian tree planting
- Use of GIS targeting tools for prioritizing wetlands restoration
- Assessment of program and/or policy barriers to wetland restoration
- Use the "My Brookies" green infrastructure initiative for homeowners in brook trout catchments
- Certify and/or support trained watershed stewards in community nutrient and sediment reduction activities
- Utilize the 'green visioning' approach to engage communities in watershed restoration planning
- Development of 'Green Master Plans' for green infrastructure planning
- Use of high-resolution land cover data to better target riparian restoration efforts for maximum sediment pollution reduction
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Multisector - Primary Approach

* 11. Select the primary INSR approach that your project focused on for dissemination.

- Riparian conservation using decision support tools and flexible design standards
- Local, cross-sector water quality trading program
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Peer Reviewed Journals

* 12. Did your organization publish one or more articles about your primary approach in peer-reviewed, academic journals (printed and/or online)?

- no
 yes

NFWF INSR Grantee Dissemination Survey 2016

Peer Reviewed Journals - Primary Audience

13. Which of the following was the project's *primary audience* for publishing articles about your primary approach in peer-reviewed, academic journals? Check only one.

- academics
 conservation professionals (e.g., consultants, engineers)
 cooperative extension offices
 farmers
 the general public
 landowners
 local residents
 organizations (i.e., those working towards Chesapeake Bay restoration) and/or their respective target audiences
 policy makers, government officials
 towns, cities, regions, jurisdictions
 other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Peer Reviewed Journals - Transfer of Knowledge

16. Which of the following was the project's *primary audience* for publishing articles about your primary approach in professional journals? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working towards Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Professional Journals - Transfer of Knowledge

17. Thinking about **Q16** for this dissemination activity...

To what degree do you think that publishing articles in professional journals about your primary approach facilitated the adoption of this approach by the primary audience?

low				moderate					high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Publish Fact Sheets

* 18. Did your organization publish one or more fact sheets (printed and/or online) about your primary approach?

- no
- yes

NFWF INSR Grantee Dissemination Survey 2016

Publish Fact Sheets - Primary Audience

19. Which of the following was the project's *primary audience* for publishing fact sheets about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Publish Fact Sheets - Transfer of Knowledge

22. Which of the following was the project's *primary audience* for publishing manuals or guides about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Publish Manuals or Guides - Transfer of Knowledge

23. Thinking about {{ Q22 }} as the primary target audience...

To what degree do you think that publishing manuals or guides about your primary approach facilitated the adoption of this approach by the primary audience?

low				moderate					high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Publish online educational videos

* 24. Did your organization publish one or more online educational videos about your primary approach?

no

yes

NFWF INSR Grantee Dissemination Survey 2016

Publish Online Educational Videos - Primary Audience

25. Which of the following was the project's *primary audience* for publishing online educational videos about your primary approach? Check only one.

academics

conservation professionals (e.g., consultants, engineers)

cooperative extension offices

farmers

the general public

landowners

local residents

organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences

policy makers, government officials

towns, cities, regions, jurisdictions

other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Publish Online Educational Videos - Transfer of Knowledge

28. Which of the following was the project's *primary audience* for publishing informational webinars about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers or government officials
- towns, cities, regions, or jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Publish Information Webinars - Transfer of Knowledge

29. Thinking about **Q28** for this dissemination activity...

To what degree do you think that publishing informational webinars about your primary approach facilitated the adoption of this approach by the primary audience?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Hold in-person trainings/workshops

* 30. Did your organization hold one or more in-person trainings/workshops about your primary approach?

- no
- yes

NFWF INSR Grantee Dissemination Survey 2016

In-Person Trainings/Workshops - Primary Audience

31. Which of the following was the project's *primary audience* for holding in-person training/workshops about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

In-Person Trainings/Workshops - Transfer of Knowledge

34. Which of the following was the project's *primary audience* for holding online training/workshops about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Online Trainings/Workshops - Transfer of Knowledge

35. Thinking about **Q34** for this dissemination activity...

To what degree do you think that holding online and/or computer-assisted trainings/workshops about your primary approach facilitated the adoption of this approach by the primary audience?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Media

* 36. Did your organization publish information using advertising and news media (e.g., newspapers, radio, TV) about your primary approach?

- no
- yes

NFWF INSR Grantee Dissemination Survey 2016

Media - Primary Audience

37. Which of the following was the project's *primary audience* for publishing information using advertising and news media about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Media - Transfer of Knowledge

40. Which of the following was the project's *primary audience* for publishing information using social media about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Social Media - Transfer of Knowledge

41. Thinking about **Q40** for this dissemination activity...

To what degree do you think that publishing information via social media about your primary approach facilitated the adoption of this approach by the primary audience?

low				moderate					high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Give presentations at professional conferences

* 42. Did your organization give one or more presentations at professional conferences about your primary approach?

- no
- yes

NFWF INSR Grantee Dissemination Survey 2016

Professional Conferences - Primary Audience

43. Which of the following was the project's *primary audience* for giving presentations at professional conferences about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Professional Conferences - Transfer of Knowledge

46. Which of the following was the project's *primary audience* for giving presentations at academic conferences about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Academic Conferences - Transfer of Knowledge

47. Thinking about **Q46** for this dissemination activity...

To what degree do you think that giving presentations at academic conferences about your primary approach facilitated the adoption of this approach by this primary audience?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Give presentations at meetings

* 48. Did your organization give one or more presentations at meetings (e.g., for local government officials or organizations) about your primary approach?

- no
- yes

NFWF INSR Grantee Dissemination Survey 2016

Meetings - Primary Audience

49. Which of the following was the project's *primary audience* for giving presentations at meetings about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Meetings - Transfer of Knowledge

50. Thinking about **Q49** for this dissemination activity...

To what degree do you think that giving presentations at meetings about your primary approach facilitated the adoption of this approach by this primary audience?

low				moderate					high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Post information in public spaces

* 51. Did your organization post information in public spaces (e.g., signage, fliers) about your primary approach?

no
 yes

NFWF INSR Grantee Dissemination Survey 2016

Information in public spaces - Primary Audience

52. Which of the following was the project's *primary audience* for posting information in public spaces about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Information in public spaces - Transfer of Knowledge

53. Thinking about **Q52** for this dissemination activity...

To what degree do you think that posting information in public spaces about your primary approach facilitated the adoption of this approach by the primary audience?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Write in #1

* 54. In its INSR proposal to NFWF, did your organization propose to disseminate information about your primary approach in a way not listed here? If yes, please describe the method of dissemination below.

- no
- yes (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Write in #1 - Primary Audience

55. Which of the following was the project's *primary audience* for {{ Q54 }}? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Write in #1 - Transfer of Knowledge

58. Did your organization disseminate information about your INSR approach to any of the following intermediaries that disseminate information on approaches for achieving nutrient and sediment reductions? Check all that apply.

- Professional membership organization
- Cooperative Extension Office
- Soil Conservation Office
- Chesapeake Watershed Forum
- Chesapeake ForumPlus
- Bay-wide Stormwater Partners Retreat
- Chesapeake Agricultural Networking Forum
- Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
- Other Non-profit conservation organization
- Local farmers
- Local/municipal government officials and staff
- Other (please specify)

* 59. Outside of the NFWF INSR proposal, did your organization develop a formal dissemination plan?

- no
- yes

NFWF INSR Grantee Dissemination Survey 2016

Dissemination Plan

60. When did you begin implementing the dissemination plan?

- Beginning of project
- Mid-point of project
- Toward end of project
- Did not implement dissemination plan

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No Dissemination Plan

61. What were the reasons for not having a dissemination plan? Check all that apply.

- INSR project did not require a dissemination plan
- Did not know how to develop a dissemination plan
- Did not have the resources to develop or implement a dissemination plan
- Did not think it was necessary or helpful to have a dissemination plan
- Did not have a target audience defined for dissemination
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Networking Forums - Chesapeake Watershed Forum

This section is intended to gather information about your organization's participation in or utilization of networking forums pertaining to the Chesapeake Bay watershed.

* 62. Has your organization ever participated in the Chesapeake Watershed Forum?

- no
- yes
- I am not sure

NFWF INSR Grantee Dissemination Survey 2016

Chesapeake Watershed Forum

63. Did your organization participate in the Chesapeake Watershed Forum in order to disseminate information about its INSR approaches?

- no
- yes
- I am not sure

NFWF INSR Grantee Dissemination Survey 2016

Chesapeake Watershed Forum

64. To what extent did your organization find the Chesapeake Watershed Forum to be appropriate for disseminating information about its INSR approaches?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

65. How would you rate the Chesapeake Watershed Forum as a forum to receive information about other INSR grantees' INSR approaches?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

NFWF INSR Grantee Dissemination Survey 2016

Networking Forums - Chesapeake ForumPlus

* 66. Has your organization ever participated in the Chesapeake ForumPlus?

- no
- yes
- I am not sure

NFWF INSR Grantee Dissemination Survey 2016

Chesapeake ForumPlus

* 81. Are you aware of any individuals, groups, organizations, government entities, and others that have adopted the primary INSR approach that you focused on for dissemination?

- no
- yes

NFWF INSR Grantee Dissemination Survey 2016

Adopting Practices/Approaches

82. Thinking about the primary approach that you focused on for dissemination, in what “phase of adoption” are those who have adopted your approach?

- Only thought about adopting the approach
- Decided to adopt the approach but have not yet started implementing
- Started to implement the approach but abandoned it
- Started to implement the approach and continue to work toward full implementation
- Fully implemented the approach
- Sustained the approach
- I do not know

83. By region of the Chesapeake Bay, about how many sites have adopted your INSR approach? The INSR approach could already be adopted or could be in the process of being adopted by individuals, groups, organizations, government entities, or others. Write in “0” if there are no new sites.

Delaware: # of sites

District of Columbia: # of sites

Maryland: # of sites

New York: # of sites

Pennsylvania: # of sites

Virginia: # of sites

West Virginia: # of sites

We are seeking your help in identifying any individuals, groups, organizations, government entities, and others that have adopted your INSR approaches so that we could invite them to participate in a survey about adoption of INSR approaches across the Chesapeake Bay watershed. Please provide names and any contact information you may have.

84. Contact #1

Name	<input type="text"/>
Organization	<input type="text"/>
City/Town	<input type="text"/>
State	<input type="text" value="-- select state --"/>
ZIP/Postal Code	<input type="text"/>
Email Address	<input type="text"/>
Phone Number	<input type="text"/>

85. Contact #2

Name	<input type="text"/>
Organization	<input type="text"/>
City/Town	<input type="text"/>
State	<input type="text" value="-- select state --"/>
ZIP/Postal Code	<input type="text"/>
Email Address	<input type="text"/>
Phone Number	<input type="text"/>

86. Contact #3

Name

Organization

City/Town

State

ZIP/Postal Code

Email Address

Phone Number

NFWF INSR Grantee Dissemination Survey 2016

For the next set of questions, we are interested in understanding the extent to which your organization has learned about other nutrient and sediment reduction approaches from other INSR grantees.

87. To what extent has your organization learned about new approaches in nutrient and sediment reduction from other INSR grantees?

low

moderate

high

* 88. Has your organization adopted any approaches in nutrient and sediment reduction from other INSR grantees?

- Yes, my organization has adopted approaches from other INSR grantees
- No, my organization has not adopted any approaches from other INSR grantees

NFWF INSR Grantee Dissemination Survey 2016

Agriculture - Adopted Approaches

The next series of questions will ask you whether you or your organization has adopted specific INSR-funded approaches to nutrient and sediment reduction in various sectors (Agriculture, Stormwater, Septics, Habitat Restoration, and Multisector).

89. Has your organization adopted any of the following approaches in nutrient and sediment reduction from other INSR grantees in the **Agriculture Sector**?

- My organization has not adopted any of these approaches
- Use of thermochemical conversion to evaluate nutrient reduction potential at one or more poultry farms
- Use of novel manure injection technologies (e.g., 'Subsurfer') for subsurface application of dry poultry and/or dairy manures
- Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes
- Use of on-farm, community-based composting
- Use of ammonia scrubbers and/or litter additives to reduce poultry house nutrient emissions
- Use of agro-forestry practices to increase market-based incentives for land conservation
- Increasing agricultural best management practice adoption/implementation by promoting benefits to recreationally-important species
- Increasing agricultural best management practice adoption/implementation by connecting water quality improvements to food system sustainability
- Increasing agricultural best management practice adoption/implementation by engaging absentee landowners
- Increasing agricultural best management practice adoption/implementation by incorporating agricultural best management practices into conservation easements
- Increasing agricultural best management practice adoption/implementation by implementing a farm certification program to increase compliance with conservation and nutrient management requirements
- Use of continuous improvement plans to promote increasing farm-scale nutrient balance over time
- Use of multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems
- Use of mentor-to-mentor programs to increase prescribed grazing
- Use of combined on-farm and stream corridor practices
- Use of "pay for performance" incentives in public conservation programs to maximize nutrient reductions
- Use of new combinations of new and existing programs to increase conservation on Plain Sect farms
- Use of a watershed-wide farmer network to enable improved nutrient management
- Use of a watershed-scale approach to agricultural nutrient reduction
- Use of trained resource teams and decision support tools to increase nutrient management on agricultural operations
- Use of whole-farm conservation systems
- Use of integrated nutrient reduction programs to promote nutrient reduction strategies
- Use of verified continuous improvement program criteria for 'reasonable assurance'

- Use of existing farm-community partnerships to manage high-density animal production areas
- Use of market-based trading programs for increased agricultural conservation
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Stormwater - Adopted Approaches

90. Has your organization adopted any of the following approaches in nutrient and sediment reduction from other INSR grantees in the **Stormwater Sector**?

- My organization has not adopted any of these approaches
- Demonstrate the use of one or more regenerative stormwater conveyance systems
- Use of biochar or water treatment residual additives in bioretention soil media to increase nutrient retention and infiltration rates
- Use of soil media additives to increase nutrient retention in stormwater management facilities
- Use of additives to sand filters in existing stormwater management practices to increase nutrient removal
- Use of agricultural subsoiling and soil amendment practices to increase infiltration in compacted urban soils
- Use of Floating Treatment Wetlands as a wetland retrofit
- Implementation of low impact development and stormwater management practices using public-private partnerships (e.g., privately-financed practices, stormwater trading)
- Use of treatment trains of innovative best management practices to manage flow and quality of stormwater runoff
- Social marketing research: Use of social marketing research to target adoption of behaviors related to residential stormwater management
- Training: Implementation of intensive training program for stormwater design professionals and local government planners
- Stormwater offsets and banking: Development or use of guidelines for implementing a stormwater offset and banking system
- Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits
- Watershed scale stormwater management: Adoption of a watershed scale program or approach for stormwater management
- Financing and capacity building: Private landowner incentive program
- Financing and capacity building: Private financing of urban stormwater retrofits
- Financing and capacity building: Expanding capacity of local government stormwater financing
- Non-traditional partnerships for stormwater management and green infrastructure: With fire and/or emergency medical services
- Non-traditional partnerships for stormwater management and green infrastructure: With houses of worship

- Non-traditional partnerships for stormwater management and green infrastructure: With affordable housing authorities
- Non-traditional partnerships for stormwater management and green infrastructure: With transportation agencies
- Non-traditional partnerships for stormwater management and green infrastructure: With schools
- Non-traditional partnerships for stormwater management and green infrastructure: Development of social engagement and urban conservation for stormwater management
- Non-traditional partnerships for stormwater management and green infrastructure: Comprehensive community engagement for stormwater management
- Green Infrastructure: Increasing coordination among small, local governments for regional green infrastructure implementation
- Green Infrastructure: Increasing residential green infrastructure adoption using outreach and stormwater audits
- Green Infrastructure: Increasing green infrastructure with community engagement and municipal staff training
- Green Infrastructure: Use of green infrastructure in highly visible, high-traffic locations
- Green Infrastructure: Institutionalizing green infrastructure with policy change and establishment of a stormwater utility
- Identifying and addressing barriers to stormwater best management practice implementation
- Installing a series of connected stormwater best management practices
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Septics - Adopted Approaches

91. Has your organization adopted the following approach in nutrient and sediment reduction from other INSR grantees in the **Septics Sector**?

- My organization has not adopted this approach
- Increasing septic system upgrades through creative financial incentives
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Habitat Restoration - Adopted Approaches

92. Has your organization adopted any of the following approaches in nutrient and sediment reduction from other INSR grantees in the **Habitat Restoration Sector**?

- My organization has not adopted any of these approaches
- Restoration of oyster reefs and measurement of associated nutrient assimilation capacity
- Use of alternatives to seedling plantings for forest buffer restoration, including any of the following: natural regeneration, direct seeding, and live staking
- Use of natural stream restoration methods for sediment reduction
- Increasing best management practice adoption by promoting benefits to recreationally-important species
- Use of targeting tools to maximize benefits of forest buffer and riparian restoration
- Use of volunteers for buffer maintenance
- Leveraging emergency disaster response activities of state and/or local agencies to improve stream and floodplain conditions
- Converting turf to trees
- Campaign to increase rural and urban riparian tree planting
- Use of GIS targeting tools for prioritizing wetlands restoration
- Assessment of program and/or policy barriers to wetland restoration
- Use the "My Brookies" green infrastructure initiative for homeowners in brook trout catchments
- Certify and/or support trained watershed stewards in community nutrient and sediment reduction activities
- Utilize the 'green visioning' approach to engage communities in watershed restoration planning
- Development of 'Green Master Plans' for green infrastructure planning
- Use of high-resolution land cover data to better target riparian restoration efforts for maximum sediment pollution reduction
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Multisector - Adopted Approaches

93. Has your organization adopted any of the following multisector approaches in nutrient and sediment reduction from other INSR grantees?

- My organization has not adopted any of these approaches
- Riparian conservation using decision support tools and flexible design standards
- Local, cross-sector water quality trading program

NFWF INSR Grantee Dissemination Survey 2016

Primary Sector

* 94. Identify the primary sector in which you adopted or attempted to adopt using an approach from other INSR grantees.

- Agriculture
- Stormwater
- Septics
- Habitat Restoration
- Multisector

NFWF INSR Grantee Dissemination Survey 2016

Agriculture - Choose primary approach

95. Which is the primary approach that you have adopted or attempted to adopt from other INSR grantees?

- My organization has not adopted any of these approaches
- Use of thermochemical conversion to evaluate nutrient reduction potential at one or more poultry farms
- Use of novel manure injection technologies (e.g., 'Subsurfer') for subsurface application of dry poultry and/or dairy manures
- Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes
- Use of on-farm, community-based composting
- Use of ammonia scrubbers and/or litter additives to reduce poultry house nutrient emissions
- Use of agro-forestry practices to increase market-based incentives for land conservation
- Increasing agricultural best management practice adoption/implementation by promoting benefits to recreationally-important species
- Increasing agricultural best management practice adoption/implementation by connecting water quality improvements to food system sustainability
- Increasing agricultural best management practice adoption/implementation by engaging absentee landowners
- Increasing agricultural best management practice adoption/implementation by incorporating agricultural best management practices into conservation easements
- Increasing agricultural best management practice adoption/implementation by implementing a farm certification program to increase compliance with conservation and nutrient management requirements

- Use of continuous improvement plans to promote increasing farm-scale nutrient balance over time
- Use of multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems
- Use of mentor-to-mentor programs to increase prescribed grazing
- Use of combined on-farm and stream corridor practices
- Use of “pay for performance” incentives in public conservation programs to maximize nutrient reductions
- Use of new combinations of new and existing programs to increase conservation on Plain Sect farms
- Use of a watershed-wide farmer network to enable improved nutrient management
- Use of a watershed-scale approach to agricultural nutrient reduction
- Use of trained resource teams and decision support tools to increase nutrient management on agricultural operations
- Use of whole-farm conservation systems
- Use of integrated nutrient reduction programs to promote nutrient reduction strategies
- Use of verified continuous improvement program criteria for ‘reasonable assurance’
- Use of existing farm-community partnerships to manage high-density animal production areas
- Use of market-based trading programs for increased agricultural conservation
- My organization has not adopted any of these approaches
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Stormwater - Choose primary approach

96. Which is the primary approach that you have adopted or attempted to adopt from other INSR grantees?

- My organization has not adopted any of these approaches
- Demonstrate the use of one or more regenerative stormwater conveyance systems
- Use of biochar or water treatment residual additives in bioretention soil media to increase nutrient retention and infiltration rates
- Use of soil media additives to increase nutrient retention in stormwater management facilities
- Use of additives to sand filters in existing stormwater management practices to increase nutrient removal
- Use of agricultural subsoiling and soil amendment practices to increase infiltration in compacted urban soils
- Use of Floating Treatment Wetlands as a wetland retrofit
- Implementation of low impact development and stormwater management practices using public-private partnerships (e.g., privately-financed practices, stormwater trading)

- Use of treatment trains of innovative best management practices to manage flow and quality of stormwater runoff
- Social marketing research: Use of social marketing research to target adoption of behaviors related to residential stormwater management
- Training: Implementation of intensive training program for stormwater design professionals and local government planners
- Stormwater offsets and banking: Development or use of guidelines for implementing a stormwater offset and banking system
- Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits
- Watershed scale stormwater management: Adoption of a watershed scale program or approach for stormwater management
- Financing and capacity building: Private landowner incentive program
- Financing and capacity building: Private financing of urban stormwater retrofits
- Financing and capacity building: Expanding capacity of local government stormwater financing
- Non-traditional partnerships for stormwater management and green infrastructure: With fire and/or emergency medical services
- Non-traditional partnerships for stormwater management and green infrastructure: With houses of worship
- Non-traditional partnerships for stormwater management and green infrastructure: With affordable housing authorities
- Non-traditional partnerships for stormwater management and green infrastructure: With transportation agencies
- Non-traditional partnerships for stormwater management and green infrastructure: With schools
- Non-traditional partnerships for stormwater management and green infrastructure: Development of social engagement and urban conservation for stormwater management
- Non-traditional partnerships for stormwater management and green infrastructure: Comprehensive community engagement for stormwater management
- Green Infrastructure: Increasing coordination among small, local governments for regional green infrastructure implementation
- Green Infrastructure: Increasing residential green infrastructure adoption using outreach and stormwater audits
- Green Infrastructure: Increasing green infrastructure with community engagement and municipal staff training
- Green Infrastructure: Use of green infrastructure in highly visible, high-traffic locations
- Green Infrastructure: Institutionalizing green infrastructure with policy change and establishment of a stormwater utility
- Identifying and addressing barriers to stormwater best management practice implementation
- Installing a series of connected stormwater best management practices
- My organization has not adopted any of these approaches
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Septics - Choose primary approach

97. Which is the primary approach that you have adopted or attempted to adopt from other INSR grantees?

- My organization has not adopted this approach
- Increasing septic system upgrades through creative financial incentives
- My organization has not adopted this approach
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Habitat Restoration - Choose primary approach

98. Which is the primary approach that you have adopted or attempted to adopt from other INSR grantees?

- My organization has not adopted any of these approaches
- Restoration of oyster reefs and measurement of associated nutrient assimilation capacity
- Use of alternatives to seedling plantings for forest buffer restoration, including any of the following: natural regeneration, direct seeding, and live staking
- Use of natural stream restoration methods for sediment reduction
- Increasing best management practice adoption by promoting benefits to recreationally-important species
- Use of targeting tools to maximize benefits of forest buffer and riparian restoration
- Use of volunteers for buffer maintenance
- Leveraging emergency disaster response activities of state and/or local agencies to improve stream and floodplain conditions
- Converting turf to trees
- Campaign to increase rural and urban riparian tree planting
- Use of GIS targeting tools for prioritizing wetlands restoration
- Assessment of program and/or policy barriers to wetland restoration
- Use the "My Brookies" green infrastructure initiative for homeowners in brook trout catchments
- Certify and/or support trained watershed stewards in community nutrient and sediment reduction activities
- Utilize the 'green visioning' approach to engage communities in watershed restoration planning
- Development of 'Green Master Plans' for green infrastructure planning
- Use of high-resolution land cover data to better target riparian restoration efforts for maximum sediment pollution reduction
- My organization has not adopted any of these approaches
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

Multisector - Choose primary approach

99. Which is the primary approach that you have adopted or attempted to adopt from other INSR grantees?

- My organization has not adopted any of these approaches
- Riparian conservation using decision support tools and flexible design standards
- Local, cross-sector water quality trading program
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

100. In general, what factors influenced your decision to try to adopt this primary adopted approach?

Please rank order all that apply so that "1" represents the most important or influential factor, "2" represents a factor that was slightly less important or influential than "1" and so on.

<input type="text"/>	The approach was recommended to me
<input type="text"/>	The approach has a good reputation
<input type="text"/>	The approach was easy to adopt (e.g., feasible, required few resources or readily available resources)
<input type="text"/>	The approach has evidence of effectiveness
<input type="text"/>	The approach is cost-effective
<input type="text"/>	Political or institutional factors

101. Describe any other factors that influenced your decision to try to adopt this approach.

102. When you attempted to adopt this approach, how far did you get in the process of adoption? Check one.

- Only thought about adopting the approach
- Decided to adopt the approach but have not yet started implementing
- Started to implement the approach but abandoned it
- Started to implement the approach and continue to work toward full implementation
- Fully implemented the approach
- Sustained the approach

NFWF INSR Grantee Dissemination Survey 2016

Please provide as much information as possible (e.g., city, state, and zip code) for the site location(s) at which this approach was, is being, or will be adopted.

103. Site 1

City/Town

State/Province

ZIP/Postal Code

104. Site 2

City/Town

State/Province

ZIP/Postal Code

105. Site 3

City/Town

State/Province

ZIP/Postal Code

NFWF INSR Grantee Dissemination Survey 2016

Experiences with & Perspectives of Dissemination and Adoption

In this section, we will ask you about your general perceptions of and experiences with disseminating information about your INSR approaches.

106. Describe your level of agreement with each statement about dissemination of your INSR project approaches using the rating scale:

	low			moderate				high		
My organization is aware of proven strategies for effective dissemination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organization had the internal capacity for effective dissemination during the INSR grant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organization was required by NFWF to disseminate information about our INSR approaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

107. Again, describe your level of agreement with each statement about dissemination of your INSR project approaches using the rating scale:

	low			moderate				high	Unsure/Project is in progress
My organization had sufficient time within the grant period to disseminate our INSR approaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organization had sufficient resources to disseminate our INSR approaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that my organization's dissemination efforts are an influential factor in the adoption of new approaches in the Chesapeake Bay watershed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

108. To date, what type of assistance did your organization seek and/or receive on ways to effectively disseminate your INSR approaches? Check all that apply.

	Seek	Receive
Assistance or support from INSR project partners	<input type="checkbox"/>	<input type="checkbox"/>
More funding from NFWF	<input type="checkbox"/>	<input type="checkbox"/>
More time from NFWF	<input type="checkbox"/>	<input type="checkbox"/>
Technical assistance from NFWF	<input type="checkbox"/>	<input type="checkbox"/>
Technical assistance from field liaison (Kristen Saacke Blunk, Headwaters LLC Consultancy)	<input type="checkbox"/>	<input type="checkbox"/>
Other type of assistance	<input type="checkbox"/>	<input type="checkbox"/>

If you selected "other type of assistance", please specify.

109. Overall, what was your level of satisfaction with the assistance you received?

low	moderate						high	My organization did not seek assistance	My organization did not receive assistance yet
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

NFWF INSR Grantee Dissemination Survey 2016

110. What were the reasons for not seeking assistance? Check all that apply.

- Did not need assistance
- Did not know our organization could ask for assistance
- Did not know that resources existed
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

111. What type of assistance would you like to receive in order to help your organization with dissemination of INSR approaches? Check all that apply.

- Technical assistance from NFWF
- Technical assistance from sources other than NFWF
- Support from your INSR project partners
- Support from other INSR grantees
- More funding from NFWF and/or other sources
- More guidance from NFWF on dissemination target audiences
- More NFWF-sponsored forums for disseminating INSR approaches across the watershed
- Other (please specify)

NFWF INSR Grantee Dissemination Survey 2016

End of survey page

You have completed the survey! Thank you for your time!

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Cover Letter

This is the second survey for Innovative Nutrient and Sediment Reduction (INSR) Program grantees with more than one approach to nutrient and sediment reduction. Please complete the first survey before completing this current one.

About the Survey

The survey questions are focused on dissemination and adoption of innovative INSR-funded grant approaches. By INSR-funded approaches, we mean those approaches that specifically were funded by the National Fish and Wildlife Foundation (NFWF) INSR grant program between 2008 and today. For the purpose of this survey, we define dissemination as the different modes and formats in which you communicate information about your INSR grant project to other stakeholders in the Bay community.

This survey asks specific questions about many different dissemination activities and formats, as well as a range of possible dissemination audiences. Please note that you are not expected to have disseminated information about your INSR grant project via all of these activities/formats, nor are you expected to have targeted all of the potential audiences. Please select only those that apply to your project. We appreciate your candid responses.

Confidentiality/Informed Consent

Your submission of a completed survey is confirmation that you are 18 years of age or older and that you consent to participate in this study.

Your participation is completely voluntary. You have the right to refuse to answer any question(s) for any reason(s), without penalty. There are minimal risks to you for filling out the survey. The potential benefit of filling out the survey is that you will contribute to a better understanding about the effectiveness of the NFWF's INSR grant program and will help NFWF better support the dissemination efforts of current and future INSR grantees.

This survey is confidential (private). Only members of the evaluation team (Dantzker Consulting, LLC and its partners on this evaluation) will have access to the survey data, which will be kept in password protected files in locked offices. For reporting purposes, individual responses will be kept confidential, and any findings from this survey will be reported in aggregate (group) form only.

If you have any questions, concerns, or complaints about this survey, please contact Dr. Heather Dantzker (Principal Investigator) at heather@dantzker.com or by calling (607-592-6040). If you wish to ask questions about your rights as an evaluation participant or to voice any problems or concerns you may have about the study to someone other than the evaluators, please call Solutions IRB at 855-226-4472 and reference IRB ID: 20160703.

Instructions for Submitting a Survey Online

This survey will take between 12 and 15 minutes depending on your answers to some of our questions. Please complete your online survey in one sitting, because you will not be able to return to an incomplete survey. The due date for completing an online survey is Friday, July 22, 2016.

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Grantee Information

* 1. Reminder: This is the second survey for INSR grantees with more than one approach to nutrient and sediment reduction. Please complete this survey keeping in mind the approach that is different from the one referenced in the first survey.

Easy Grant #	<input type="text"/>
Your name	<input type="text"/>
Your current title	<input type="text"/>
Your organization	<input type="text"/>
Your E-mail address	<input type="text"/>
Your role on the project	<input type="text"/>

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Primary approach

This section is intended to gather information about dissemination activities associated with the INSR project identified on the previous page.

* 2. Which of the following best describes the sector associated with your INSR project?

- Agriculture
- Stormwater
- Septics
- Habitat Restoration
- Multisector

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Agriculture - Primary Approach

* 3. Select the primary INSR approach that your project focused on for dissemination.

- Use of thermochemical conversion to evaluate nutrient reduction potential at one or more poultry farms
- Use of novel manure injection technologies (e.g., 'Subsurfer') for subsurface application of dry poultry and/or dairy manures
- Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes
- Use of on-farm, community-based composting
- Use of ammonia scrubbers and/or litter additives to reduce poultry house nutrient emissions
- Use of agro-forestry practices to increase market-based incentives for land conservation
- Increasing agricultural best management practice adoption/implementation by or use of... (if you choose this option, you will be taken to another page with more specific approaches to choose from)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Agriculture: Increasing agricultural BMP adoption/implementation

* 4. Please select your specific approach.

- Increasing agricultural best management practice adoption/implementation by **promoting benefits to recreationally-important species**
- Increasing agricultural best management practice adoption/implementation by **connecting water quality improvements to food system sustainability**
- Increasing agricultural best management practice adoption/implementation by **engaging absentee landowners**
- Increasing agricultural best management practice adoption/implementation by **incorporating agricultural best management practices into conservation easements**
- Increasing agricultural best management practice adoption/implementation by **implementing a farm certification program to increase compliance with conservation and nutrient management requirements**
- Use of continuous improvement plans to promote increasing farm-scale nutrient balance over time
- Use of multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems
- Use of mentor-to-mentor programs to increase prescribed grazing
- Use of combined on-farm and stream corridor practices
- Use of “pay for performance” incentives in public conservation programs to maximize nutrient reductions
- Use of new combinations of new and existing programs to increase conservation on Plain Sect farms
- Use of a watershed-wide farmer network to enable improved nutrient management
- Use of a watershed-scale approach to agricultural nutrient reduction
- Use of trained resource teams and decision support tools to increase nutrient management on agricultural operations
- Use of whole-farm conservation systems
- Use of integrated nutrient reduction programs to promote nutrient reduction strategies
- Use of verified continuous improvement program criteria for ‘reasonable assurance’
- Use of existing farm-community partnerships to manage high-density animal production areas
- Use of market-based trading programs for increased agricultural conservation

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Stormwater - Primary Approach

* 5. Select the primary INSR approach that your project focused on for dissemination.

- Demonstrate the use of one or more regenerative stormwater conveyance systems
- Use of biochar or water treatment residual additives in bioretention soil media to increase nutrient retention and infiltration rates
- Use of soil media additives to increase nutrient retention in stormwater management facilities
- Use of additives to sand filters in existing stormwater management practices to increase nutrient removal
- Use of agricultural subsoiling and soil amendment practices to increase infiltration in compacted urban soils
- Use of Floating Treatment Wetlands as a wetland retrofit
- Implementation of low impact development and stormwater management practices using public-private partnerships (e.g., privately-financed practices, stormwater trading)
- Use of treatment trains of innovative best management practices to manage flow and quality of stormwater runoff
- Social marketing research: Use of social marketing research to target adoption of behaviors related to residential stormwater management
- Training: Implementation of intensive training program for stormwater design professionals and local government planners
- Stormwater offsets and banking: Development or use of guidelines for implementing a stormwater offset and banking system
- Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits
- Watershed scale stormwater management: Adoption of a watershed scale program or approach for stormwater management
- Financing and capacity building (if you choose this option, you will be taken to another page with more specific approaches to choose from)
- Non-traditional partnerships for stormwater management and green infrastructure (if you choose this option, you will be taken to another page with more specific approaches to choose from)
- Green Infrastructure (if you choose this option, you will be taken to another page with more specific approaches to choose from)
- Identifying and addressing barriers to stormwater best management practice implementation
- Installing a series of connected stormwater best management practices
- Other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Stormwater - Financing and capacity building

* 6. Please select your specific approach.

- Financing and capacity building: Private landowner incentive program
- Financing and capacity building: Private financing of urban stormwater retrofits
- Financing and capacity building: Expanding capacity of local government stormwater financing

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Stormwater - Non-traditional partnerships

* 7. Please select your specific approach.

- Non-traditional partnerships for stormwater management and green infrastructure: **With fire and/or emergency medical services**
- Non-traditional partnerships for stormwater management and green infrastructure: **With houses of worship**
- Non-traditional partnerships for stormwater management and green infrastructure: **With affordable housing authorities**
- Non-traditional partnerships for stormwater management and green infrastructure: **With transportation agencies**
- Non-traditional partnerships for stormwater management and green infrastructure: **With schools**
- Non-traditional partnerships for stormwater management and green infrastructure: **Development of social engagement and urban conservation for stormwater management**
- Non-traditional partnerships for stormwater management and green infrastructure: **Comprehensive community engagement for stormwater management**

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Stormwater - Green Infrastructure

* 8. Please select your specific approach.

- Green Infrastructure: **Increasing coordination among small, local governments for regional green infrastructure implementation**
- Green Infrastructure: **Increasing residential green infrastructure adoption using outreach and stormwater audits**
- Green Infrastructure: **Increasing green infrastructure with community engagement and municipal staff training**
- Green Infrastructure: **Use of green infrastructure in highly visible, high-traffic locations**
- Green Infrastructure: **Institutionalizing green infrastructure with policy change and establishment of a stormwater utility**

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Septics - Primary Approach

* 9. Select the primary INSR approach that your project focused on for dissemination.

- Increasing septic system upgrades through creative financial incentives
- Other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Habitat Restoration - Primary Approach

* 10. Select the primary INSR approach that your project focused on for dissemination.

- Restoration of oyster reefs and measurement of associated nutrient assimilation capacity
- Use of alternatives to seedling plantings for forest buffer restoration, including any of the following: natural regeneration, direct seeding, and live staking
- Use of natural stream restoration methods for sediment reduction
- Increasing best management practice adoption by promoting benefits to recreationally-important species
- Use of targeting tools to maximize benefits of forest buffer and riparian restoration
- Use of volunteers for buffer maintenance
- Leveraging emergency disaster response activities of state and/or local agencies to improve stream and floodplain conditions
- Converting turf to trees
- Campaign to increase rural and urban riparian tree planting
- Use of GIS targeting tools for prioritizing wetlands restoration
- Assessment of program and/or policy barriers to wetland restoration
- Use the "My Brookies" green infrastructure initiative for homeowners in brook trout catchments
- Certify and/or support trained watershed stewards in community nutrient and sediment reduction activities
- Utilize the 'green visioning' approach to engage communities in watershed restoration planning
- Development of 'Green Master Plans' for green infrastructure planning
- Use of high-resolution land cover data to better target riparian restoration efforts for maximum sediment pollution reduction
- Other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Multisector - Primary Approach

* 11. Select the primary INSR approach that your project focused on for dissemination.

- Riparian conservation using decision support tools and flexible design standards
- Local, cross-sector water quality trading program
- Other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Peer Reviewed Journals

* 12. Did your organization publish one or more articles about your primary approach in peer-reviewed, academic journals (printed and/or online)?

- no
- yes

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Peer Reviewed Journals - Primary Audience

13. Which of the following was the project's *primary audience* for publishing articles about your primary approach in peer-reviewed, academic journals? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working towards Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Peer Reviewed Journals - Transfer of Knowledge

16. Which of the following was the project's *primary audience* for publishing articles about your primary approach in professional journals? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working towards Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Professional Journals - Transfer of Knowledge

17. Thinking about **Q16** for this dissemination activity...

To what degree do you think that publishing articles in professional journals about your primary approach facilitated the adoption of this approach by the primary audience?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Publish Fact Sheets

* 18. Did your organization publish one or more fact sheets (printed and/or online) about your primary approach?

- no
- yes

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Publish Fact Sheets - Primary Audience

19. Which of the following was the project's *primary audience* for publishing fact sheets about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Publish Fact Sheets - Transfer of Knowledge

22. Which of the following was the project's *primary audience* for publishing manuals or guides about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Publish Manuals or Guides - Transfer of Knowledge

23. Thinking about **Q22** as the primary target audience...

To what degree do you think that publishing manuals or guides about your primary approach facilitated the adoption of this approach by the primary audience?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Publish online educational videos

* 24. Did your organization publish one or more online educational videos about your primary approach?

no

yes

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Publish Online Educational Videos - Primary Audience

25. Which of the following was the project's *primary audience* for publishing online educational videos about your primary approach? Check only one.

academics

conservation professionals (e.g., consultants, engineers)

cooperative extension offices

farmers

the general public

landowners

local residents

organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences

policy makers, government officials

towns, cities, regions, jurisdictions

other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Publish Online Educational Videos - Transfer of Knowledge

28. Which of the following was the project's *primary audience* for publishing informational webinars about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers or government officials
- towns, cities, regions, or jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Publish Information Webinars - Transfer of Knowledge

29. Thinking about **Q28** for this dissemination activity...

To what degree do you think that publishing informational webinars about your primary approach facilitated the adoption of this approach by the primary audience?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Hold in-person trainings/workshops

* 30. Did your organization hold one or more in-person trainings/workshops about your primary approach?

no

yes

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

In-Person Trainings/Workshops - Primary Audience

31. Which of the following was the project's *primary audience* for holding in-person training/workshops about your primary approach? Check only one.

academics

conservation professionals (e.g., consultants, engineers)

cooperative extension offices

farmers

the general public

landowners

local residents

organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences

policy makers, government officials

towns, cities, regions, jurisdictions

other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

In-Person Trainings/Workshops - Transfer of Knowledge

34. Which of the following was the project's *primary audience* for holding online training/workshops about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Online Trainings/Workshops - Transfer of Knowledge

35. Thinking about **Q34** for this dissemination activity...

To what degree do you think that holding online and/or computer-assisted trainings/workshops about your primary approach facilitated the adoption of this approach by the primary audience?

low				moderate					high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Media

* 36. Did your organization publish information using advertising and news media (e.g., newspapers, radio, TV) about your primary approach?

- no
- yes

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Media - Primary Audience

37. Which of the following was the project's *primary audience* for publishing information using advertising and news media about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Media - Transfer of Knowledge

40. Which of the following was the project's *primary audience* for publishing information using social media about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Social Media - Transfer of Knowledge

41. Thinking about **Q40** for this dissemination activity...

To what degree do you think that publishing information via social media about your primary approach facilitated the adoption of this approach by the primary audience?

low				moderate					high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Give presentations at professional conferences

* 42. Did your organization give one or more presentations at professional conferences about your primary approach?

- no
- yes

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Professional Conferences - Primary Audience

43. Which of the following was the project's *primary audience* for giving presentations at professional conferences about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Professional Conferences - Transfer of Knowledge

46. Which of the following was the project's *primary audience* for giving presentations at academic conferences about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Academic Conferences - Transfer of Knowledge

47. Thinking about **Q46** for this dissemination activity...

To what degree do you think that giving presentations at academic conferences about your primary approach facilitated the adoption of this approach by this primary audience?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Give presentations at meetings

* 48. Did your organization give one or more presentations at meetings (e.g., for local government officials or organizations) about your primary approach?

- no
- yes

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Meetings - Primary Audience

49. Which of the following was the project's *primary audience* for giving presentations at meetings about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Meetings - Transfer of Knowledge

52. Which of the following was the project's *primary audience* for posting information in public spaces about your primary approach? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Information in public spaces - Transfer of Knowledge

53. Thinking about **Q52** for this dissemination activity...

To what degree do you think that posting information in public spaces about your primary approach facilitated the adoption of this approach by the primary audience?

low					moderate						high	I do not know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Dissemination Activities - Write in #1

* 54. In its INSR proposal to NFWF, did your organization propose to disseminate information about your primary approach in a way not listed here? If yes, please describe the method of dissemination below.

- no
- yes (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Write in #1 - Primary Audience

55. Which of the following was the project's *primary audience* for {{ Q54 }}? Check only one.

- academics
- conservation professionals (e.g., consultants, engineers)
- cooperative extension offices
- farmers
- the general public
- landowners
- local residents
- organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- policy makers, government officials
- towns, cities, regions, jurisdictions
- other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Write in #1 - Transfer of Knowledge

58. Did your organization disseminate information about your INSR approach to any of the following intermediaries that disseminate information on approaches for achieving nutrient and sediment reductions? Check all that apply.

- Professional membership organization
- Cooperative Extension Office
- Soil Conservation Office
- Chesapeake Watershed Forum
- Chesapeake ForumPlus
- Bay-wide Stormwater Partners Retreat
- Chesapeake Agricultural Networking Forum
- Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
- Other Non-profit conservation organization
- Local farmers
- Local/municipal government officials and staff
- Other (please specify)

* 59. Outside of the NFWF INSR proposal, did your organization develop a formal dissemination plan?

- no
- yes

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Dissemination Plan

60. When did you begin implementing the dissemination plan?

- Beginning of project
- Mid-point of project
- Toward end of project
- Did not implement dissemination plan

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

No Dissemination Plan

61. What were the reasons for not having a dissemination plan? Check all that apply.

- INSR project did not require a dissemination plan
- Did not know how to develop a dissemination plan
- Did not have the resources to develop or implement a dissemination plan
- Did not think it was necessary or helpful to have a dissemination plan
- Did not have a target audience defined for dissemination
- Other (please specify)

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Adopting Practices/Approaches

62. To what degree has your organization received feedback about or interest in your INSR approach?

low

moderate

high

63. In what ways are you getting feedback about or interest in your INSR approach? Check all that apply.

- Conferences
- E-mails
- In-person contact
- Media attention
- Networking events
- Phone calls
- Website inquiries
- We are not getting feedback
- Other (please specify)

* 64. Are you aware of any individuals, groups, organizations, government entities, and others that have adopted the primary INSR approach that you focused on for dissemination?

- no
- yes

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

Adopting Practices/Approaches

65. Thinking about the primary approach that you focused on for dissemination, in what “phase of adoption” are those who have adopted your approach?

- Only thought about adopting the approach
- Decided to adopt the approach but have not yet started implementing
- Started to implement the approach but abandoned it
- Started to implement the approach and continue to work toward full implementation
- Fully implemented the approach
- Sustained the approach
- I do not know

66. By region of the Chesapeake Bay, about how many sites have adopted your INSR approach? The INSR approach could already be adopted or could be in the process of being adopted by individuals, groups, organizations, government entities, or others. Write in "0" if there are no new sites.

Delaware: # of sites

District of Columbia: # of sites

Maryland: # of sites

New York: # of sites

Pennsylvania: # of sites

Virginia: # of sites

West Virginia: # of sites

Survey 2 - NFWF INSR Grantee Dissemination Survey 2016

End of survey page

You have completed the survey! Thank you for your time!

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

Introduction

The National Fish and Wildlife Foundation (NFWF) Chesapeake Bay Stewardship Fund's Innovative Nutrient and Sediment Reduction (INSR) Program is undergoing an evaluation conducted by Dantzker Consulting, LLC and its partners. The purpose of the INSR grant program is to support efforts within the Chesapeake Bay and its watershed to vastly accelerate nutrient and sediment reductions with innovative, sustainable, and cost-effective approaches. NFWF has awarded more than 100 INSR grants since 2008. A main goal of the INSR program is to actively transfer and disseminate lessons learned from the awarded grant projects to the larger Bay region community. Thus, one of the primary components of the NFWF INSR evaluation is to collect information from both INSR grantees and others in the Bay watershed about INSR dissemination activities in order to better understand whether and which innovative reduction technologies are familiar to Bay community stakeholders and/or being adopted throughout the Bay region. Findings from the survey will be utilized by NFWF to understand the uptake of innovative approaches for nutrient and sediment reduction in the region and to support INSR grantees to use the most effective strategies for disseminating information about these approaches to the Bay community.

About the Survey

This survey is for organizations and individuals in the Bay community that may have had an opportunity to learn about and/or adopt INSR-funded approaches to nutrient and sediment reduction. By "INSR-funded approaches," we mean those approaches that specifically were funded by NFWF's INSR grant program between 2008 and today. By "adopt INSR-funded approaches," we mean that you or your organization attempted to implement an INSR-funded approach, regardless of the extent to which you succeeded in implementing the approach. Please note that you (or your organization) do NOT need to have attempted to implement an INSR-funded approach in order to complete this survey.

Confidentiality/Informed Consent

Your submission of a completed survey is confirmation that you are 18 years of age or older and that you consent to participate in this study.

Your participation is completely voluntary. You have the right to refuse to answer any question(s) for any reason(s), without penalty. There are minimal risks to you for filling out the survey. The potential benefit of filling out the survey is that you will contribute to a better understanding about the effectiveness of NFWF's INSR grant program and will help NFWF better support the dissemination of innovations in nutrient and sediment reduction in the Chesapeake Bay watershed.

This survey is confidential (private). Only members of the evaluation team (Dantzker Consulting, LLC and its partners on this evaluation) will have access to the survey data, which will be kept in password protected files in locked offices. For reporting purposes, individual responses will be kept confidential, and any findings from this survey will be reported in aggregate (group) form only.

If you have any questions, concerns, or complaints about this survey, please contact Dr. Heather Dantzker (Principal Investigator) at heather@dantzker.com or by calling (607-592-6040). If you wish to ask questions about your rights as an evaluation participant or to voice any problems or concerns you may have about the study to someone other than the evaluators, please call Solutions IRB at 855-226-4472 and reference IRB ID: 20160703.

Instructions for Submitting a Survey Online

This survey will take between 5 and 25 minutes depending on your answers to some of our questions. Please complete your online survey in one sitting, because you will not be able to return to an incomplete survey. The due date for completing an online survey is Monday, August 8, 2016.

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 1. You may have different personal and professional affiliations that impact the work that you do for the Chesapeake Bay. As you complete this survey, we would like you to do so from the perspective of one primary affiliation. Please tell us which primary affiliation you will be referencing as you complete this survey. I am (or my organization is)...

- An academic
- A conservation professional (e.g., consultant, engineer, landscape architect)
- A Cooperative Extension representative
- A farmer
- A non-farm landowner
- A member of the general public
- A government representative (e.g., policy maker, government official or government employee)
- A philanthropic or funding organization representative
- A non-profit conservation organization representative
- A representative of an organization not listed above that works toward Chesapeake Bay restoration
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

2. If you answered that your primary affiliation is that you are a representative of an organization that works toward Chesapeake Bay restoration, what organization do you represent?

3. What is the location of your organization? Please provide the zip code.

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

4. Prior to receiving this survey, were you aware of the National Fish and Wildlife Foundation's Innovative Nutrient and Sediment Reduction (INSR) grants program?

- Yes
- No
- I don't know

5. Have you ever worked or collaborated on an INSR-funded project with an individual or organization that was the lead grantee on an INSR grant?

- Yes
- No
- I don't know

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

Throughout the survey we use the terms "adopt approach" or "adopting approaches" as umbrella terms meant to capture everything from an initial decision to try a new approach, to implementing that approach in the field, to sustaining the implementation of that approach over time.

* 6. Thinking about the *primary* affiliation you selected, please indicate which of the following you represent.

Note: If you identify with more than one option below, please choose the option that appears higher on the list. For example, if you (or your organization) is someone who has adopted an approach for achieving nutrient and sediment reductions but you also are an intermediary who disseminates such approaches, please select that you are someone who has adopted approaches for achieving nutrient and sediment reductions.

- I am (or my organization is) someone who has adopted approaches for achieving nutrient and sediment reductions
- I am (or my organization is) someone who would consider adopting approaches for achieving nutrient and sediment reductions, but I have not yet done so.
- I am (or the organization I represent is) an intermediary that disseminates information about approaches for achieving nutrient and sediment reductions.
- I am (or the organization I represent is) not someone who would either adopt or disseminate information on approaches for achieving nutrient and sediment reductions.

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

The next series of questions will ask you whether you or your organization has adopted specific INSR-funded approaches to nutrient and sediment reduction in various sectors (Agriculture, Stormwater, Septics, Habitat Restoration, and Multisector).

* 7. Has your organization adopted any of the following approaches to nutrient and sediment reduction in the **Agriculture Sector**? Check all that apply.

- My organization has not adopted or tried to adopt any of these approaches
- Use of thermochemical conversion to evaluate nutrient reduction potential at one or more poultry farms
- Use of novel manure injection technologies (e.g., 'Subsurfer') for subsurface application of dry poultry and/or dairy manures
- Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes
- Use of on-farm, community-based composting
- Use of ammonia scrubbers and/or litter additives to reduce poultry house nutrient emissions
- Use of agro-forestry practices to increase market-based incentives for land conservation
- Increasing agricultural best management practice adoption/implementation by promoting benefits to recreationally-important species
- Increasing agricultural best management practice adoption/implementation by connecting water quality improvements to food system sustainability
- Increasing agricultural best management practice adoption/implementation by engaging absentee landowners
- Increasing agricultural best management practice adoption/implementation by incorporating agricultural best management practices into conservation easements
- Increasing agricultural best management practice adoption/implementation by implementing a farm certification program to increase compliance with conservation and nutrient management requirements
- Use of continuous improvement plans to promote increasing farm-scale nutrient balance over time
- Use of multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems
- Use of mentor-to-mentor programs to increase prescribed grazing
- Use of combined on-farm and stream corridor practices
- Use of "pay for performance" incentives in public conservation programs to maximize nutrient reductions
- Use of new combinations of new and existing programs to increase conservation on Plain Sect farms
- Use of a watershed-wide farmer network to enable improved nutrient management
- Use of a watershed-scale approach to agricultural nutrient reduction
- Use of trained resource teams and decision support tools to increase nutrient management on agricultural operations
- Use of whole-farm conservation systems
- Use of integrated nutrient reduction programs to promote nutrient reduction strategies
- Use of verified continuous improvement program criteria for 'reasonable assurance'
- Use of existing farm-community partnerships to manage high-density animal production areas
- Use of market-based trading programs for increased agricultural conservation

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 8. Has your organization adopted any of the following approaches to nutrient and sediment reduction in the **Stormwater Sector**? Check all that apply.

- My organization has not adopted or tried to adopt any of these approaches
- Demonstrate the use of one or more regenerative stormwater conveyance systems
- Use of biochar or water treatment residual additives in bioretention soil media to increase nutrient retention and infiltration rates
- Use of soil media additives to increase nutrient retention in stormwater management facilities
- Use of additives to sand filters in existing stormwater management practices to increase nutrient removal
- Use of agricultural subsoiling and soil amendment practices to increase infiltration in compacted urban soils
- Use of Floating Treatment Wetlands as a wetland retrofit
- Implementation of low impact development and stormwater management practices using public-private partnerships (e.g., privately-financed practices, stormwater trading)
- Use of treatment trains of innovative best management practices to manage flow and quality of stormwater runoff
- Social marketing research: Use of social marketing research to target adoption of behaviors related to residential stormwater management
- Training: Implementation of intensive training program for stormwater design professionals and local government planners
- Stormwater offsets and banking: Development or use of guidelines for implementing a stormwater offset and banking system
- Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits
- Watershed scale stormwater management: Adoption of a watershed scale program or approach for stormwater management
- Financing and capacity building: Private landowner incentive program
- Financing and capacity building: Private financing of urban stormwater retrofits
- Financing and capacity building: Expanding capacity of local government stormwater financing
- Non-traditional partnerships for stormwater management and green infrastructure: With fire and/or emergency medical services
- Non-traditional partnerships for stormwater management and green infrastructure: With houses of worship
- Non-traditional partnerships for stormwater management and green infrastructure: With affordable housing authorities
- Non-traditional partnerships for stormwater management and green infrastructure: With transportation agencies
- Non-traditional partnerships for stormwater management and green infrastructure: With schools
- Non-traditional partnerships for stormwater management and green infrastructure: Development of social engagement and urban conservation for stormwater management
- Non-traditional partnerships for stormwater management and green infrastructure: Comprehensive community engagement for stormwater management

- Green Infrastructure: Increasing coordination among small, local governments for regional green infrastructure implementation
- Green Infrastructure: Increasing residential green infrastructure adoption using outreach and stormwater audits
- Green Infrastructure: Increasing green infrastructure with community engagement and municipal staff training
- Green Infrastructure: Use of green infrastructure in highly visible, high-traffic locations
- Green Infrastructure: Institutionalizing green infrastructure with policy change and establishment of a stormwater utility
- Identifying and addressing barriers to stormwater best management practice implementation
- Installing a series of connected stormwater best management practices

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 9. Has your organization adopted the following approach to nutrient and sediment reduction in the **Septics Sector**?

- Increasing septic system upgrades through creative financial incentives
- My organization has not adopted or tried to adopt this approach

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 10. Has your organization adopted any of the following approaches to nutrient and sediment reduction in the **Habitat Restoration Sector**? Check all that apply.

- My organization has not adopted or tried to adopt any of these approaches
- Restoration of oyster reefs and measurement of associated nutrient assimilation capacity
- Use of alternatives to seedling plantings for forest buffer restoration, including any of the following: natural regeneration, direct seeding, and live staking
- Use of natural stream restoration methods for sediment reduction
- Increasing best management practice adoption by promoting benefits to recreationally-important species
- Use of targeting tools to maximize benefits of forest buffer and riparian restoration
- Use of volunteers for buffer maintenance
- Leveraging emergency disaster response activities of state and/or local agencies to improve stream and floodplain conditions
- Converting turf to trees
- Campaign to increase rural and urban riparian tree planting
- Use of GIS targeting tools for prioritizing wetlands restoration
- Assessment of program and/or policy barriers to wetland restoration
- Use the "My Brookies" green infrastructure initiative for homeowners in brook trout catchments
- Certify and/or support trained watershed stewards in community nutrient and sediment reduction activities
- Utilize the 'green visioning' approach to engage communities in watershed restoration planning
- Development of 'Green Master Plans' for green infrastructure planning
- Use of high-resolution land cover data to better target riparian restoration efforts for maximum sediment pollution reduction

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 11. Has your organization adopted any of the following multi-sector approaches to nutrient and sediment reduction? Check all that apply.

- Riparian conservation using decision support tools and flexible design standards
- Local, cross-sector water quality trading program
- My organization has not adopted or tried to adopt any of the above approaches

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 12. What is your primary sector?

- Agriculture
- Stormwater
- Septics
- Habitat Restoration
- Multisector

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

Of the approaches that you chose previously, now please choose one primary approach to reference as you answer the next set of questions. You can interpret “primary” to mean whatever makes the most sense in the context of your work.

* 13. Which is the primary approach to nutrient and sediment reduction that you have adopted or attempted to adopt?

- My organization has not adopted or tried to adopt any of these approaches
- Use of thermochemical conversion to evaluate nutrient reduction potential at one or more poultry farms
- Use of novel manure injection technologies (e.g., ‘Subsurfer’) for subsurface application of dry poultry and/or dairy manures
- Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes
- Use of on-farm, community-based composting
- Use of ammonia scrubbers and/or litter additives to reduce poultry house nutrient emissions
- Use of agro-forestry practices to increase market-based incentives for land conservation
- Increasing agricultural best management practice adoption/implementation by promoting benefits to recreationally-important species
- Increasing agricultural best management practice adoption/implementation by connecting water quality improvements to food system sustainability
- Increasing agricultural best management practice adoption/implementation by engaging absentee landowners
- Increasing agricultural best management practice adoption/implementation by incorporating agricultural best management practices into conservation easements
- Increasing agricultural best management practice adoption/implementation by implementing a farm certification program to increase compliance with conservation and nutrient management requirements
- Use of continuous improvement plans to promote increasing farm-scale nutrient balance over time

- Use of multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems
- Use of mentor-to-mentor programs to increase prescribed grazing
- Use of combined on-farm and stream corridor practices
- Use of “pay for performance” incentives in public conservation programs to maximize nutrient reductions
- Use of new combinations of new and existing programs to increase conservation on Plain Sect farms
- Use of a watershed-wide farmer network to enable improved nutrient management
- Use of a watershed-scale approach to agricultural nutrient reduction
- Use of trained resource teams and decision support tools to increase nutrient management on agricultural operations
- Use of whole-farm conservation systems
- Use of integrated nutrient reduction programs to promote nutrient reduction strategies
- Use of verified continuous improvement program criteria for ‘reasonable assurance’
- Use of existing farm-community partnerships to manage high-density animal production areas
- Use of market-based trading programs for increased agricultural conservation
- My organization has not adopted or tried to adopt any of the following approaches
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

Of the approaches that you chose previously, now please choose one primary approach to reference as you answer the next set of questions. You can interpret “primary” to mean whatever makes the most sense in the context of your work.

* 14. Which is the primary approach to nutrient and sediment reduction that you have adopted or attempted to adopt?

- My organization has not adopted or tried to adopt any of these approaches
- Demonstrate the use of one or more regenerative stormwater conveyance systems
- Use of biochar or water treatment residual additives in bioretention soil media to increase nutrient retention and infiltration rates
- Use of soil media additives to increase nutrient retention in stormwater management facilities
- Use of additives to sand filters in existing stormwater management practices to increase nutrient removal
- Use of agricultural subsoiling and soil amendment practices to increase infiltration in compacted urban soils
- Use of Floating Treatment Wetlands as a wetland retrofit

- Implementation of low impact development and stormwater management practices using public-private partnerships (e.g., privately-financed practices, stormwater trading)
- Use of treatment trains of innovative best management practices to manage flow and quality of stormwater runoff
- Social marketing research: Use of social marketing research to target adoption of behaviors related to residential stormwater management
- Training: Implementation of intensive training program for stormwater design professionals and local government planners
- Stormwater offsets and banking: Development or use of guidelines for implementing a stormwater offset and banking system
- Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits
- Watershed scale stormwater management: Adoption of a watershed scale program or approach for stormwater management
- Financing and capacity building: Private landowner incentive program
- Financing and capacity building: Private financing of urban stormwater retrofits
- Financing and capacity building: Expanding capacity of local government stormwater financing
- Non-traditional partnerships for stormwater management and green infrastructure: With fire and/or emergency medical services
- Non-traditional partnerships for stormwater management and green infrastructure: With houses of worship
- Non-traditional partnerships for stormwater management and green infrastructure: With affordable housing authorities
- Non-traditional partnerships for stormwater management and green infrastructure: With transportation agencies
- Non-traditional partnerships for stormwater management and green infrastructure: With schools
- Non-traditional partnerships for stormwater management and green infrastructure: Development of social engagement and urban conservation for stormwater management
- Non-traditional partnerships for stormwater management and green infrastructure: Comprehensive community engagement for stormwater management
- Green Infrastructure: Increasing coordination among small, local governments for regional green infrastructure implementation
- Green Infrastructure: Increasing residential green infrastructure adoption using outreach and stormwater audits
- Green Infrastructure: Increasing green infrastructure with community engagement and municipal staff training
- Green Infrastructure: Use of green infrastructure in highly visible, high-traffic locations
- Green Infrastructure: Institutionalizing green infrastructure with policy change and establishment of a stormwater utility
- Identifying and addressing barriers to stormwater best management practice implementation
- Installing a series of connected stormwater best management practices
- My organization has not adopted or tried to adopt any of the above approaches
- Other (please specify)

Of the approaches that you chose previously, now please choose one primary approach to reference as you answer the next set of questions. You can interpret “primary” to mean whatever makes the most sense in the context of your work.

* 15. Which is the primary approach to nutrient and sediment reduction that you have adopted or attempted to adopt?

- My organization has not adopted or tried to adopt this approach
- Increasing septic system upgrades through creative financial incentives
- My organization has not adopted or tried to adopt this approach
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

Of the approaches that you chose previously, now please choose one primary approach to reference as you answer the next set of questions. You can interpret “primary” to mean whatever makes the most sense in the context of your work.

* 16. Which is the primary approach to nutrient and sediment reduction that you have adopted or attempted to adopt?

- My organization has not adopted or tried to adopt any of these approaches
- Restoration of oyster reefs and measurement of associated nutrient assimilation capacity
- Use of alternatives to seedling plantings for forest buffer restoration, including any of the following: natural regeneration, direct seeding, and live staking
- Use of natural stream restoration methods for sediment reduction
- Increasing best management practice adoption by promoting benefits to recreationally-important species
- Use of targeting tools to maximize benefits of forest buffer and riparian restoration
- Use of volunteers for buffer maintenance
- Leveraging emergency disaster response activities of state and/or local agencies to improve stream and floodplain conditions
- Converting turf to trees
- Campaign to increase rural and urban riparian tree planting
- Use of GIS targeting tools for prioritizing wetlands restoration
- Assessment of program and/or policy barriers to wetland restoration
- Use the "My Brookies" green infrastructure initiative for homeowners in brook trout catchments
- Certify and/or support trained watershed stewards in community nutrient and sediment reduction activities
- Utilize the 'green visioning' approach to engage communities in watershed restoration planning
- Development of 'Green Master Plans' for green infrastructure planning
- Use of high-resolution land cover data to better target riparian restoration efforts for maximum sediment pollution reduction
- My organization has not adopted or tried to adopt any of the above approaches
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

Of the approaches that you chose previously, now please choose one primary approach to reference as you answer the next set of questions. You can interpret "primary" to mean whatever makes the most sense in the context of your work.

* 17. Which is the primary approach to nutrient and sediment reduction that you have adopted or attempted to adopt?

- My organization has not adopted or tried to adopt any of these approaches
- Riparian conservation using decision support tools and flexible design standards
- Local, cross-sector water quality trading program
- My organization has not adopted or tried to adopt any of the above approaches
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

18. *In general*, what factors influenced your decision to try to adopt your primary approach? Please rank order all that apply so that “1” represents the most important or influential factor, “2” represents a factor that was slightly less important or influential than “1” and so on.

<input type="text"/>	The approach was recommended by university, cooperative extension, or other technical expert
<input type="text"/>	The approach was recommended by federal, state, or local government sources
<input type="text"/>	The approach was recommended to me by family, neighbors, or friends
<input type="text"/>	The approach has a good reputation
<input type="text"/>	The approach was easy to adopt (e.g., feasible, required few resources or readily available resources)
<input type="text"/>	The approach has evidence of effectiveness
<input type="text"/>	The approach is cost-effective
<input type="text"/>	Political/institutional factors
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	It was important to adopt this approach to improve how I/we are perceived by others

19. When you attempted to adopt your primary approach, how far did you get in the process of adoption?

- Only thought about adopting the approach
- Decided to adopt but have not yet started implementing
- Started to implement the approach but abandoned it
- Started to implement the approach and continue to work toward full implementation
- Fully implemented the approach
- Sustained the approach
- I don't know

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 20. Please provide as much information as possible (e.g., city or county, state, and zip code) for the site location(s) at which this primary approach is (or was) being adopted.

Site 1 city or county, state,
zip code

Site 2 city or county, state,
zip code

Site 3 city or county, state,
zip code

Site 4 city or county, state,
zip code

21. What challenges did you encounter as you adopted or tried to adopt your primary approach? Check all that apply.

- Did not encounter any challenges
- Lack of financial resources
- Lack of time
- Competing priorities
- Competing approaches to get at same result
- Lack of internal organizational support
- Failure to achieve desired outcome(s) from adopting the approach
- Technical aspects of the approach
- Lack of support from external partners
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 22. Have you shared your primary approach with others?

- Yes
- No

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

23. In what ways have you shared your primary approach with others? Check all that apply.

- Informal communications (e.g., Emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed, academic journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
- Educational videos
- Informational webinars (not training webinars)
- Advertising and news media (e.g., newspapers, radio, TV)
- Social media (e.g., Facebook, YouTube, Twitter)
- Presentations at professional conferences
- Presentations at academic conferences
- Presentations at meetings (e.g., for local government or organizations)
- In-person trainings/workshops
- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

24. With whom have you shared your primary approach? Check all that apply.

- Academics
- Conservation professionals (e.g., consultants, engineers)
- Cooperative Extension offices
- Farmers
- General public
- Landowners
- Organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- Policy makers, government officials
- Towns, cities, regions, jurisdictions
- Neighbors/Friends
- Family
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

25. Thinking back to when you learned about your primary approach for nutrient and sediment reduction, what were the sources from which you received this information? Please rank order the **top three sources of information** that were the most influential in your decision to try to adopt the primary approach with 1 being the most influential.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

26. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred sources of information? Please rank order **your top three preferred sources of information** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

27. Thinking back to when you received information about your primary approach, in what format(s) did you receive this information? Check all that apply.

- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed, academic journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
- Educational videos
- Informational webinars (not training webinars)
- Media (e.g., newspapers, radio, TV)
- Social media (e.g., Facebook, YouTube, Twitter)
- Presentations at professional conferences
- Presentations at academic conferences
- Presentations at meetings (e.g., for local government or organizations)
- In-person trainings/workshops
- Online and/or computer-assisted trainings/workshops
- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

28. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred formats for receiving this information? Please rank order **your top three preferred information formats** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
<input type="text"/>	Articles in peer-reviewed, academic journals (printed and/or online)
<input type="text"/>	Articles in professional journals (e.g., Bay Journal)
<input type="text"/>	Fact sheets (printed and/or online)
<input type="text"/>	Manuals or guides (printed and/or online)
<input type="text"/>	Educational videos
<input type="text"/>	Informational webinars (not training webinars)
<input type="text"/>	Media (e.g., newspapers, radio, TV)
<input type="text"/>	Social media (e.g., Facebook, YouTube, Twitter)
<input type="text"/>	Presentations at professional conferences
<input type="text"/>	Presentations at academic conferences
<input type="text"/>	Presentations at meetings (e.g., for local government or organizations)
<input type="text"/>	In-person trainings/workshops
<input type="text"/>	Online and/or computer-assisted trainings/workshops
<input type="text"/>	Public events (e.g., tours for public)
<input type="text"/>	Information posted in public spaces (e.g., signage, fliers)

29. *In general*, what factors influence whether you adopt an approach to reduce nutrient and sediment pollution? Please rank order all that apply with 1 being the most influential.

<input type="text"/>	If others in my community are also adopting approaches
<input type="text"/>	If the approach is recommended to me by a university, cooperative extension staff, or other technical expert
<input type="text"/>	If the approach is recommended to me by a federal, state, or local government source
<input type="text"/>	If the approach is recommended to me by family, neighbors, or friends
<input type="text"/>	Level of ease and effort that it would take to adopt the approach
<input type="text"/>	How widespread the approach is
<input type="text"/>	Evidence of effectiveness of the approach
<input type="text"/>	Cost-benefit or cost-effectiveness of the approach
<input type="text"/>	Resources needed for the approach
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	Political/institutional factors

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

30. *In general*, what factors influenced your decision to try to adopt your primary approach? Please rank order all that apply so that “1” represents the most important or influential factor, “2” represents a factor that was slightly less important or influential than “1” and so on.

<input type="text"/>	The approach was recommended by university, cooperative extension, or other technical expert
<input type="text"/>	The approach was recommended by federal, state, or local government sources
<input type="text"/>	The approach was recommended to me by family, neighbors, or friends
<input type="text"/>	The approach has a good reputation
<input type="text"/>	The approach was easy to adopt (e.g., feasible, required few resources or readily available resources)
<input type="text"/>	The approach has evidence of effectiveness
<input type="text"/>	The approach is cost-effective
<input type="text"/>	Political/institutional factors
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	It was important to adopt this approach to improve how I/we are perceived by others

31. When you attempted to adopt your primary approach, how far did you get in the process of adoption?

- Only thought about adopting the approach
- Decided to adopt but have not yet started implementing
- Started to implement the approach but abandoned it
- Started to implement the approach and continue to work toward full implementation
- Fully implemented the approach
- Sustained the approach
- I don't know

32. Please provide as much information as possible (e.g., city or county, state, and zip code) for the site location(s) at which this primary approach is (or was) being adopted.

Site 1 city or county, state,
zip code

Site 2 city or county, state,
zip code

Site 3 city or county, state,
zip code

Site 4 city or county, state,
zip code

33. What challenges did you encounter as you adopted or tried to adopt your primary approach? Check all that apply.

- Did not encounter any challenges
- Lack of financial resources
- Lack of time
- Competing priorities
- Competing approaches to get at same result
- Lack of internal organizational support
- Failure to achieve desired outcome(s) from adopting the approach
- Technical aspects of the approach
- Lack of support from external partners
- Other (please specify)

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* 34. Have you shared your primary approach with others?

- Yes
- No

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

35. In what ways have you shared your primary approach with others? Check all that apply.

- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed, academic journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
- Educational videos
- Informational webinars (not training webinars)
- Advertising and news media (e.g., newspapers, radio, TV)
- Social media (e.g., Facebook, YouTube, Twitter)
- Presentations at professional conferences
- Presentations at academic conferences
- Presentations at meetings (e.g., for local government or organizations)
- In-person trainings/workshops
- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

36. With whom have you shared your primary approach? Check all that apply.

- Academics
- Conservation professionals (e.g., consultants, engineers)
- Cooperative Extension offices
- Farmers
- General public
- Landowners
- Organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- Policy makers, government officials
- Towns, cities, regions, jurisdictions
- Neighbors/Friends
- Family
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

37. Thinking back to when you learned about your primary approach, what were the sources from which you received this information? Please rank order the **top three sources of information** that were the most influential in your decision to try to adopt the primary approach with 1 being the most influential.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

38. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred sources of information? Please rank order **your top three preferred sources of information** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

39. Thinking back to when you received information about your primary approach, in what format(s) did you receive this information? Check all that apply.

- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed, academic journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
- Educational videos
- Informational webinars (not training webinars)
- Advertising and news media (e.g., newspapers, radio, TV)
- Social media (e.g., Facebook, YouTube, Twitter)
- Presentations at professional conferences
- Presentations at academic conferences
- Presentations at meetings (e.g., for local government or organizations)
- In-person trainings/workshops
- Online and/or computer-assisted trainings/workshops
- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

40. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred formats for receiving this information? Please rank order **your top three preferred information formats** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
<input type="text"/>	Articles in peer-reviewed, academic journals (printed and/or online)
<input type="text"/>	Articles in professional journals (e.g., Bay Journal)
<input type="text"/>	Fact sheets (printed and/or online)
<input type="text"/>	Manuals or guides (printed and/or online)
<input type="text"/>	Educational videos
<input type="text"/>	Informational webinars (not training webinars)
<input type="text"/>	Advertising and news media (e.g., newspapers, radio, TV)
<input type="text"/>	Social media (e.g., Facebook, YouTube, Twitter)
<input type="text"/>	Presentations at professional conferences
<input type="text"/>	Presentations at academic conferences
<input type="text"/>	Presentations at meetings (e.g., for local government or organizations)
<input type="text"/>	In-person trainings/workshops
<input type="text"/>	Online and/or computer-assisted trainings/workshops
<input type="text"/>	Public events (e.g., tours for public)
<input type="text"/>	Information posted in public spaces (e.g., signage, fliers)

41. *In general*, what factors influence whether you adopt an approach to reduce nutrient and sediment pollution? Please rank order all that apply with 1 being the most influential.

<input type="text"/>	If others in my community are also adopting approaches
<input type="text"/>	If the approach is recommended to me by a university, cooperative extension staff, or other technical expert
<input type="text"/>	If the approach is recommended to me by a federal, state, or local government source
<input type="text"/>	If the approach is recommended to me by family, neighbors, or friends
<input type="text"/>	Level of ease and effort that it would take to adopt the approach
<input type="text"/>	How widespread the approach is
<input type="text"/>	Evidence of effectiveness of the approach
<input type="text"/>	Cost-benefit or cost-effectiveness of the approach
<input type="text"/>	Resources needed for the approach
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	Political/institutional factors

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

42. *In general*, what factors influenced your decision to try to adopt your primary approach? Please rank order all that apply so that “1” represents the most important or influential factor, “2” represents a factor that was slightly less important or influential than “1” and so on.

<input type="text"/>	The approach was recommended by university, cooperative extension, or other technical expert
<input type="text"/>	The approach was recommended by federal, state, or local government sources
<input type="text"/>	The approach was recommended to me by family, neighbors, or friends
<input type="text"/>	The approach has a good reputation
<input type="text"/>	The approach was easy to adopt (e.g., feasible, required few resources or readily available resources)
<input type="text"/>	The approach has evidence of effectiveness
<input type="text"/>	The approach is cost-effective
<input type="text"/>	Political/institutional factors
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	It was important to adopt this approach to improve how I/we are perceived by others

43. When you attempted to adopt your primary approach, how far did you get in the process of adoption?

- Only thought about adopting the approach
- Decided to adopt but have not yet started implementing
- Started to implement the approach but abandoned it
- Started to implement the approach and continue to work toward full implementation
- Fully implemented the approach
- Sustained the approach
- I don't know

44. Please provide as much information as possible (e.g., city or county, state, and zip code) for the site location(s) at which your primary approach is (or was) being adopted.

Site 1 city or county, state,
zip code

Site 2 city or county, state,
zip code

Site 3 city or county, state,
zip code

Site 4 city or county, state,
zip code

45. What challenges did you encounter as you adopted or tried to adopt your primary approach? Check all that apply.

- Did not encounter any challenges
- Lack of financial resources
- Lack of time
- Competing priorities
- Competing approaches to get at same result
- Lack of internal organizational support
- Failure to achieve desired outcome(s) from adopting the approach
- Technical aspects of the approach
- Lack of support from external partners
- Other (please specify)

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* 46. Have you shared your primary approach with others?

- Yes
- No

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

47. In what ways have you shared your primary approach with others? Check all that apply.

- Informal communications (e.g., Emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed, academic journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
- Educational videos
- Informational webinars (not training webinars)
- Advertising and news media (e.g., newspapers, radio, TV)
- Social media (e.g., Facebook, YouTube, Twitter)
- Presentations at professional conferences
- Presentations at academic conferences
- Presentations at meetings (e.g., for local government or organizations)
- In-person trainings/workshops
- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

48. With whom have you shared your primary approach? Check all that apply.

- Academics
- Conservation professionals (e.g., consultants, engineers)
- Cooperative Extension offices
- Farmers
- General public
- Landowners
- Organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- Policy makers, government officials
- Towns, cities, regions, jurisdictions
- Neighbors/Friends
- Family
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

49. Thinking back to when you learned about your primary approach, what were the sources from which you received this information? Please rank order **the top three sources of information** that were the most influential in your decision to try to adopt the primary approach with 1 being the most influential.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

50. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred sources of information? Please rank order **your top three preferred sources of information** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

51. Thinking back to when you received information about your primary approach, in what format(s) did you receive this information? Check all that apply.

- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed, academic journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
- Educational videos
- Informational webinars (not training webinars)
- Advertising and news media (e.g., newspapers, radio, TV)
- Social media (e.g., Facebook, YouTube, Twitter)
- Presentations at professional conferences
- Presentations at academic conferences
- Presentations at meetings (e.g., for local government or organizations)
- In-person trainings/workshops
- Online and/or computer-assisted trainings/workshops
- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

52. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred formats for receiving this information? Please rank order **your top three preferred information formats** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
<input type="text"/>	Articles in peer-reviewed journals (printed and/or online)
<input type="text"/>	Articles in professional journals (e.g., Bay Journal)
<input type="text"/>	Fact sheets (printed and/or online)
<input type="text"/>	Manuals or guides (printed and/or online)
<input type="text"/>	Educational videos
<input type="text"/>	Informational webinars (not training webinars)
<input type="text"/>	Advertising and news media (e.g., newspapers, radio, TV)
<input type="text"/>	Social media (e.g., Facebook, YouTube, Twitter)
<input type="text"/>	Presentations at professional conferences
<input type="text"/>	Presentations at academic conferences
<input type="text"/>	Presentations at meetings (e.g., for local government or organizations)
<input type="text"/>	In-person trainings/workshops
<input type="text"/>	Online and/or computer-assisted trainings/workshops
<input type="text"/>	Public events (e.g., tours for public)
<input type="text"/>	Information posted in public spaces (e.g., signage, fliers)

53. *In general*, what factors influence whether you adopt an approach to reduce nutrient and sediment pollution? Please rank order all that apply with 1 being the most influential.

<input type="text"/>	If others in my community are also adopting approaches
<input type="text"/>	If the approach is recommended to me by a university, cooperative extension staff, or other technical expert
<input type="text"/>	If the approach is recommended to me by a federal, state, or local government source
<input type="text"/>	If the approach is recommended to me by family, neighbors, or friends
<input type="text"/>	Level of ease and effort that it would take to adopt the approach
<input type="text"/>	How widespread the approach is
<input type="text"/>	Evidence of effectiveness of the approach
<input type="text"/>	Cost-benefit or cost-effectiveness of the approach
<input type="text"/>	Resources needed for the approach
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	Political/institutional factors

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

54. *In general*, what factors influenced your decision to try to adopt your primary approach? Please rank order all that apply so that “1” represents the most important or influential factor, “2” represents a factor that was slightly less important or influential than “1” and so on.

<input type="text"/>	The approach was recommended by university, cooperative extension, or other technical expert
<input type="text"/>	The approach was recommended by federal, state, or local government sources
<input type="text"/>	The approach was recommended to me by family, neighbors, or friends
<input type="text"/>	The approach has a good reputation
<input type="text"/>	The approach was easy to adopt (e.g., feasible, required few resources or readily available resources)
<input type="text"/>	The approach has evidence of effectiveness
<input type="text"/>	The approach is cost-effective
<input type="text"/>	Political/institutional factors
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	It was important to adopt this approach to improve how I/we are perceived by others

55. When you attempted to adopt your primary approach, how far did you get in the process of adoption?

- Only thought about adopting the approach
- Decided to adopt but have not yet started implementing
- Started to implement the approach but abandoned it
- Started to implement the approach and continue to work toward full implementation
- Fully implemented the approach
- Sustained the approach
- I don't know

56. Please provide as much information as possible (e.g., city or county, state, and zip code) for the site location(s) at which your primary approach is (or was) being adopted.

Site 1 city or county, state,
zip code

Site 2 city or county, state,
zip code

Site 3 city or county, state,
zip code

Site 4 city or county, state,
zip code

57. What challenges did you encounter as you adopted or tried to adopt your primary approach? Check all that apply.

- Did not encounter any challenges
- Lack of financial resources
- Lack of time
- Competing priorities
- Competing approaches to get at same result
- Lack of internal organizational support
- Failure to achieve desired outcome(s) from adopting the approach
- Technical aspects of the approach
- Lack of support from external partners
- Other (please specify)

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* 58. Have you shared your primary approach with others?

- Yes
- No

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

59. In what ways have you shared your primary approach with others? Check all that apply.

- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
- Educational videos
- Informational webinars (not training webinars)
- Advertising and news media (e.g., newspapers, radio, TV)
- Social media (e.g., Facebook, YouTube, Twitter)
- Presentations at professional conferences
- Presentations at academic conferences
- Presentations at meetings (e.g., for local government or organizations)
- In-person trainings/workshops
- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

60. With whom have you shared your primary approach? Check all that apply.

- Academics
- Conservation professionals (e.g., consultants, engineers)
- Cooperative Extension offices
- Farmers
- General public
- Landowners
- Organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- Policy makers, government officials
- Towns, cities, regions, jurisdictions
- Neighbors/Friends
- Family
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

61. Thinking back to when you learned about your primary approach, what were the sources from which you received this information? Please rank order **the top three sources of information** that were the most influential in your decision to try to adopt the primary approach with 1 being the most influential.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

62. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred sources of information? Please rank order **your top three preferred sources of information** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

63. Thinking back to when you received information about your primary approach, in what format(s) did you receive this information? Check all that apply.

- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
- Educational videos
- Informational webinars (not training webinars)
- Advertising and news media (e.g., newspapers, radio, TV)
- Social media (e.g., Facebook, YouTube, Twitter)
- Presentations at professional conferences
- Presentations at academic conferences
- Presentations at meetings (e.g., for local government or organizations)
- In-person trainings/workshops
- Online and/or computer-assisted trainings/workshops
- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

64. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred formats for receiving this information? Please rank order **your top three preferred information formats** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
<input type="text"/>	Articles in peer-reviewed journals (printed and/or online)
<input type="text"/>	Articles in professional journals (e.g., Bay Journal)
<input type="text"/>	Fact sheets (printed and/or online)
<input type="text"/>	Manuals or guides (printed and/or online)
<input type="text"/>	Educational videos
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<input type="text"/>	Advertising and news media (e.g., newspapers, radio, TV)
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<input type="text"/>	Online and/or computer-assisted trainings/workshops
<input type="text"/>	Public events (e.g., tours for public)
<input type="text"/>	Information posted in public spaces (e.g., signage, fliers)

65. *In general*, what factors influence whether you adopt an approach to reduce nutrient and sediment pollution? Please rank order all that apply with 1 being the most influential.

<input type="text"/>	If others in my community are also adopting approaches
<input type="text"/>	If the approach is recommended to me by a university, cooperative extension staff, or other technical expert
<input type="text"/>	If the approach is recommended to me by a federal, state, or local government source
<input type="text"/>	If the approach is recommended to me by family, neighbors, or friends
<input type="text"/>	Level of ease and effort that it would take to adopt the approach
<input type="text"/>	How widespread the approach is
<input type="text"/>	Evidence of effectiveness of the approach
<input type="text"/>	Cost-benefit or cost-effectiveness of the approach
<input type="text"/>	Resources needed for the approach
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	Political/institutional factors

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

66. *In general*, what factors influenced your decision to try to adopt your primary approach? Please rank order all that apply so that “1” represents the most important or influential factor, “2” represents a factor that was slightly less important or influential than “1” and so on.

<input type="text"/>	The approach was recommended by university, cooperative extension, or other technical expert
<input type="text"/>	The approach was recommended by federal, state, or local government sources
<input type="text"/>	The approach was recommended to me by family, neighbors, or friends
<input type="text"/>	The approach has a good reputation
<input type="text"/>	The approach was easy to adopt (e.g., feasible, required few resources or readily available resources)
<input type="text"/>	The approach has evidence of effectiveness
<input type="text"/>	The approach is cost-effective
<input type="text"/>	Political/institutional factors
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	It was important to adopt this approach to improve how I/we are perceived by others

67. When you attempted to adopt your primary approach, how far did you get in the process of adoption?

- Only thought about adopting the approach
- Decided to adopt but have not yet started implementing
- Started to implement the approach but abandoned it
- Started to implement the approach and continue to work toward full implementation
- Fully implemented the approach
- Sustained the approach
- I don't know

68. Please provide as much information as possible (e.g., city or county, state, and zip code) for the site location(s) at which your primary approach is (or was) being adopted.

Site 1 city or county, state,
zip code

Site 2 city or county, state,
zip code

Site 3 city or county, state,
zip code

Site 4 city or county, state,
zip code

69. What challenges did you encounter as you adopted or tried to adopt your primary approach? Check all that apply.

- Did not encounter any challenges
- Lack of financial resources
- Lack of time
- Competing priorities
- Competing approaches to get at same result
- Lack of internal organizational support
- Failure to achieve desired outcome(s) from adopting the approach
- Technical aspects of the approach
- Lack of support from external partners
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 70. Have you shared your primary approach with others?

- Yes
- No

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

71. In what ways have you shared your primary approach with others? Check all that apply.

- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
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- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

72. With whom have you shared your primary approach? Check all that apply.

- Academics
- Conservation professionals (e.g., consultants, engineers)
- Cooperative Extension offices
- Farmers
- General public
- Landowners
- Organizations (i.e., those working toward Chesapeake Bay restoration) and/or their respective target audiences
- Policy makers, government officials
- Towns, cities, regions, jurisdictions
- Neighbors/Friends
- Family
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

73. Thinking back to when you learned about your primary approach, what were the sources from which you received this information? Please rank order the **top three sources of information** that were the most influential in your decision to try to adopt the primary approach with 1 being the most influential.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
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<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

74. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred sources of information? Please rank order **your top three preferred sources of information** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
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<input type="text"/>	Local farmers
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<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

75. Thinking back to when you received information about your primary approach, in what format(s) did you receive this information? Check all that apply.

- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
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- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

76. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred formats for receiving this information? Please rank order **your top three preferred information formats** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

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<input type="text"/>	Online and/or computer-assisted trainings/workshops
<input type="text"/>	Public events (e.g., tours for public)
<input type="text"/>	Information posted in public spaces (e.g., signage, fliers)

77. *In general*, what factors influence whether you adopt an approach to reduce nutrient and sediment pollution? Please rank order all that apply with 1 being the most influential.

<input type="text"/>	If others in my community are also adopting approaches
<input type="text"/>	If the approach is recommended to me by a university, cooperative extension staff, or other technical expert
<input type="text"/>	If the approach is recommended to me by a federal, state, or local government source
<input type="text"/>	If the approach is recommended to me by family, neighbors, or friends
<input type="text"/>	Level of ease and effort that it would take to adopt the approach
<input type="text"/>	How widespread the approach is
<input type="text"/>	Evidence of effectiveness of the approach
<input type="text"/>	Cost-benefit or cost-effectiveness of the approach
<input type="text"/>	Resources needed for the approach
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	Political/institutional factors

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

The next series of questions will ask you whether you have heard of specific INSR-funded approaches to nutrient and sediment reduction in various sectors (Agriculture, Stormwater, Septics, Habitat Restoration, and Multisector).

* 78. In the past decade, which of the following types of approaches for nutrient and sediment reduction, if any, do you recall having heard about in the Agriculture sector? Check all that apply.

- I have not heard about any of these approaches
- Use of thermochemical conversion to evaluate nutrient reduction potential at one or more poultry farms
- Use of novel manure injection technologies (e.g., 'Subsurfer') for subsurface application of dry poultry and/or dairy manures
- Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes
- Use of on-farm, community-based composting
- Use of ammonia scrubbers and/or litter additives to reduce poultry house nutrient emissions
- Use of agro-forestry practices to increase market-based incentives for land conservation
- Increasing agricultural best management practice adoption/implementation by promoting benefits to recreationally-important species
- Increasing agricultural best management practice adoption/implementation by connecting water quality improvements to food system sustainability
- Increasing agricultural best management practice adoption/implementation by engaging absentee landowners
- Increasing agricultural best management practice adoption/implementation by incorporating agricultural best management practices into conservation easements
- Increasing agricultural best management practice adoption/implementation by implementing a farm certification program to increase compliance with conservation and nutrient management requirements
- Use of continuous improvement plans to promote increasing farm-scale nutrient balance over time
- Use of multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems
- Use of mentor-to-mentor programs to increase prescribed grazing
- Use of combined on-farm and stream corridor practices
- Use of "pay for performance" incentives in public conservation programs to maximize nutrient reductions
- Use of new combinations of new and existing programs to increase conservation on Plain Sect farms
- Use of a watershed-wide farmer network to enable improved nutrient management
- Use of a watershed-scale approach to agricultural nutrient reduction
- Use of trained resource teams and decision support tools to increase nutrient management on agricultural operations
- Use of whole-farm conservation systems
- Use of integrated nutrient reduction programs to promote nutrient reduction strategies
- Use of verified continuous improvement program criteria for 'reasonable assurance'
- Use of existing farm-community partnerships to manage high-density animal production areas
- Use of market-based trading programs for increased agricultural conservation

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 79. In the past decade, which of the following types of approaches for nutrient and sediment reduction, if any, do you recall having heard about in the Stormwater sector? Check all that apply.

- I have not heard about any of these approaches
- Demonstrate the use of one or more regenerative stormwater conveyance systems
- Use of biochar or water treatment residual additives in bioretention soil media to increase nutrient retention and infiltration rates
- Use of soil media additives to increase nutrient retention in stormwater management facilities
- Use of additives to sand filters in existing stormwater management practices to increase nutrient removal
- Use of agricultural subsoiling and soil amendment practices to increase infiltration in compacted urban soils
- Use of Floating Treatment Wetlands as a wetland retrofit
- Implementation of low impact development and stormwater management practices using public-private partnerships (e.g., privately-financed practices, stormwater trading)
- Use of treatment trains of innovative best management practices to manage flow and quality of stormwater runoff
- Social marketing research: Use of social marketing research to target adoption of behaviors related to residential stormwater management
- Training: Implementation of intensive training program for stormwater design professionals and local government planners
- Stormwater offsets and banking: Development or use of guidelines for implementing a stormwater offset and banking system
- Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits
- Watershed scale stormwater management: Adoption of a watershed scale program or approach for stormwater management
- Financing and capacity building: Private landowner incentive program
- Financing and capacity building: Private financing of urban stormwater retrofits
- Financing and capacity building: Expanding capacity of local government stormwater financing
- Non-traditional partnerships for stormwater management and green infrastructure: With fire and/or emergency medical services
- Non-traditional partnerships for stormwater management and green infrastructure: With houses of worship
- Non-traditional partnerships for stormwater management and green infrastructure: With affordable housing authorities
- Non-traditional partnerships for stormwater management and green infrastructure: With transportation agencies
- Non-traditional partnerships for stormwater management and green infrastructure: With schools
- Non-traditional partnerships for stormwater management and green infrastructure: Development of social engagement and urban conservation for stormwater management
- Non-traditional partnerships for stormwater management and green infrastructure: Comprehensive community engagement for stormwater management

- Green Infrastructure: Increasing coordination among small, local governments for regional green infrastructure implementation
- Green Infrastructure: Increasing residential green infrastructure adoption using outreach and stormwater audits
- Green Infrastructure: Increasing green infrastructure with community engagement and municipal staff training
- Green Infrastructure: Use of green infrastructure in highly visible, high-traffic locations
- Green Infrastructure: Institutionalizing green infrastructure with policy change and establishment of a stormwater utility
- Identifying and addressing barriers to stormwater best management practice implementation
- Installing a series of connected stormwater best management practices

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 80. In the past decade, have you heard about the following approach for nutrient and sediment reduction in the Septic sector?

- Increasing septic system upgrades through creative financial incentives
- I have not heard about this approach

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 81. In the past decade, which of the following types of approaches for nutrient and sediment reduction, if any, do you recall having heard about in the Habitat Restoration sector? Check all that apply.

- I have not heard about any of these approaches
- Restoration of oyster reefs and measurement of associated nutrient assimilation capacity
- Use of alternatives to seedling plantings for forest buffer restoration, including any of the following: natural regeneration, direct seeding, and live staking
- Use of natural stream restoration methods for sediment reduction
- Increasing best management practice adoption by promoting benefits to recreationally-important species
- Use of targeting tools to maximize benefits of forest buffer and riparian restoration
- Use of volunteers for buffer maintenance
- Leveraging emergency disaster response activities of state and/or local agencies to improve stream and floodplain conditions
- Converting turf to trees
- Campaign to increase rural and urban riparian tree planting
- Use of GIS targeting tools for prioritizing wetlands restoration
- Assessment of program and/or policy barriers to wetland restoration
- Use the "My Brookies" green infrastructure initiative for homeowners in brook trout catchments
- Certify and/or support trained watershed stewards in community nutrient and sediment reduction activities
- Utilize the 'green visioning' approach to engage communities in watershed restoration planning
- Development of 'Green Master Plans' for green infrastructure planning
- Use of high-resolution land cover data to better target riparian restoration efforts for maximum sediment pollution reduction

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 82. In the past decade, which of the following types of multi sector approaches for nutrient and sediment reduction, if any, do you recall having heard about? Check all that apply.

- Local, cross-sector water quality trading program
- Riparian conservation using decision support tools and flexible design standards
- I have not heard about any of these approaches

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

83. Overall, what kinds of information did you receive about the approaches for nutrient and sediment reduction that you identified previously? Check all that apply.

- Not Applicable - I did not receive any information about the approaches listed previously
- Information about what the practice/approach is
- Information about how to adopt the practice/approach (e.g., "How to" manuals or guides; training)
- Information about the successes associated with the practice/approach
- Information about the challenges associated with the practice/approach
- Information about outcomes associated with the practice/approach (e.g., reductions, improvements in water quality)

84. What prevented you or your organization from adopting any of these approaches? Check all that apply.

- I had not heard of the approaches
- Had no interest at the outset
- Not enough information about effectiveness
- Not enough information about cost-benefit or cost-effectiveness
- Did not have adequate resources
- Competing priorities
- The approach was not a priority for me or my organization
- Not enough organizational support
- Decided to try a different approach
- None of the approaches were technically appropriate for our use
- Other (please specify)

85. Thinking back to when you learned or received information about the approaches to nutrient and sediment reduction that you identified previously, what were the sources from which you received this information? Please check all that apply.

- Not Applicable - I did not receive any information about the approaches
- Professional membership organization
- Cooperative Extension Office
- Soil Conservation office
- Chesapeake Watershed Forum
- Chesapeake ForumPlus
- Bay-wide Stormwater Partners Retreat
- Chesapeake Agricultural Networking Forum
- Local farmers
- Local/municipal government officials and staff
- Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
- Other Non-profit conservation organization
- Other (please specify)

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

86. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred sources of information? Please rank order **your top three preferred sources of information** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
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<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

87. Again, thinking back to when you heard or received information about the approaches for nutrient and sediment reduction that you identified previously, in what format(s) did you receive this information? Please check all that apply.

- Not Applicable - I did not receive any information about the approaches
- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
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88. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred formats for receiving this information? Please rank order **your top three preferred information formats** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

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89. *In general*, what factors influence whether you adopt an approach to reduce nutrient and sediment pollution? Please rank order all that apply with 1 = the most influential, 2 = the second most influential, etc.

<input type="text"/>	If others in my community are also adopting approaches
<input type="text"/>	If the approach is recommended to me by a university, cooperative extension staff, or other technical expert
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Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

The next series of questions will ask you whether you have heard of specific INSR-funded approaches to nutrient and sediment reduction in various sectors (Agriculture, Stormwater, Septics, Habitat Restoration, and Multisector).

* 90. In the past decade, which of the following types of approaches for nutrient and sediment reduction, if any, do you recall having heard about in the Agriculture sector? Check all that apply.

- I have not heard about any of these approaches
- Use of thermochemical conversion to evaluate nutrient reduction potential at one or more poultry farms
- Use of novel manure injection technologies (e.g., 'Subsurfer') for subsurface application of dry poultry and/or dairy manures
- Use of bioreactor practices to mitigate subsurface nutrient transport in agricultural landscapes
- Use of on-farm, community-based composting
- Use of ammonia scrubbers and/or litter additives to reduce poultry house nutrient emissions
- Use of agro-forestry practices to increase market-based incentives for land conservation
- Increasing agricultural best management practice adoption/implementation by promoting benefits to recreationally-important species
- Increasing agricultural best management practice adoption/implementation by connecting water quality improvements to food system sustainability
- Increasing agricultural best management practice adoption/implementation by engaging absentee landowners
- Increasing agricultural best management practice adoption/implementation by incorporating agricultural best management practices into conservation easements
- Increasing agricultural best management practice adoption/implementation by implementing a farm certification program to increase compliance with conservation and nutrient management requirements
- Use of continuous improvement plans to promote increasing farm-scale nutrient balance over time
- Use of multiple public programs and creative incentive structures to advance riparian management practices as part of whole-farm conservation systems
- Use of mentor-to-mentor programs to increase prescribed grazing
- Use of combined on-farm and stream corridor practices
- Use of "pay for performance" incentives in public conservation programs to maximize nutrient reductions
- Use of new combinations of new and existing programs to increase conservation on Plain Sect farms
- Use of a watershed-wide farmer network to enable improved nutrient management
- Use of a watershed-scale approach to agricultural nutrient reduction
- Use of trained resource teams and decision support tools to increase nutrient management on agricultural operations
- Use of whole-farm conservation systems
- Use of integrated nutrient reduction programs to promote nutrient reduction strategies
- Use of verified continuous improvement program criteria for 'reasonable assurance'
- Use of existing farm-community partnerships to manage high-density animal production areas
- Use of market-based trading programs for increased agricultural conservation

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 91. In the past decade, which of the following types of approaches for nutrient and sediment reduction, if any, do you recall having heard about in the Stormwater sector? Check all that apply.

- I have not heard about any of these approaches
- Demonstrate the use of one or more regenerative stormwater conveyance systems
- Use of biochar or water treatment residual additives in bioretention soil media to increase nutrient retention and infiltration rates
- Use of soil media additives to increase nutrient retention in stormwater management facilities
- Use of additives to sand filters in existing stormwater management practices to increase nutrient removal
- Use of agricultural subsoiling and soil amendment practices to increase infiltration in compacted urban soils
- Use of Floating Treatment Wetlands as a wetland retrofit
- Implementation of low impact development and stormwater management practices using public-private partnerships (e.g., privately-financed practices, stormwater trading)
- Use of treatment trains of innovative best management practices to manage flow and quality of stormwater runoff
- Social marketing research: Use of social marketing research to target adoption of behaviors related to residential stormwater management
- Training: Implementation of intensive training program for stormwater design professionals and local government planners
- Stormwater offsets and banking: Development or use of guidelines for implementing a stormwater offset and banking system
- Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits
- Watershed scale stormwater management: Adoption of a watershed scale program or approach for stormwater management
- Financing and capacity building: Private landowner incentive program
- Financing and capacity building: Private financing of urban stormwater retrofits
- Financing and capacity building: Expanding capacity of local government stormwater financing
- Non-traditional partnerships for stormwater management and green infrastructure: With fire and/or emergency medical services
- Non-traditional partnerships for stormwater management and green infrastructure: With houses of worship
- Non-traditional partnerships for stormwater management and green infrastructure: With affordable housing authorities
- Non-traditional partnerships for stormwater management and green infrastructure: With transportation agencies
- Non-traditional partnerships for stormwater management and green infrastructure: With schools
- Non-traditional partnerships for stormwater management and green infrastructure: Development of social engagement and urban conservation for stormwater management
- Non-traditional partnerships for stormwater management and green infrastructure: Comprehensive community engagement for stormwater management

- Green Infrastructure: Increasing coordination among small, local governments for regional green infrastructure implementation
- Green Infrastructure: Increasing residential green infrastructure adoption using outreach and stormwater audits
- Green Infrastructure: Increasing green infrastructure with community engagement and municipal staff training
- Green Infrastructure: Use of green infrastructure in highly visible, high-traffic locations
- Green Infrastructure: Institutionalizing green infrastructure with policy change and establishment of a stormwater utility
- Identifying and addressing barriers to stormwater best management practice implementation
- Installing a series of connected stormwater best management practices

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 92. In the past decade, do you recall having heard about the following approach in the Septic sector?

- Increasing septic system upgrades through creative financial incentives
- I have not heard about this approach

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* 93. In the past decade, which of the following types of approaches for nutrient and sediment reduction, if any, do you recall having heard about in the Habitat Restoration sector? Check all that apply.

- I have not heard about any of these approaches
- Restoration of oyster reefs and measurement of associated nutrient assimilation capacity
- Use of alternatives to seedling plantings for forest buffer restoration, including any of the following: natural regeneration, direct seeding, and live staking
- Use of natural stream restoration methods for sediment reduction
- Increasing best management practice adoption by promoting benefits to recreationally-important species
- Use of targeting tools to maximize benefits of forest buffer and riparian restoration
- Use of volunteers for buffer maintenance
- Leveraging emergency disaster response activities of state and/or local agencies to improve stream and floodplain conditions
- Converting turf to trees
- Campaign to increase rural and urban riparian tree planting
- Use of GIS targeting tools for prioritizing wetlands restoration
- Assessment of program and/or policy barriers to wetland restoration
- Use the "My Brookies" green infrastructure initiative for homeowners in brook trout catchments
- Certify and/or support trained watershed stewards in community nutrient and sediment reduction activities
- Utilize the 'green visioning' approach to engage communities in watershed restoration planning
- Development of 'Green Master Plans' for green infrastructure planning
- Use of high-resolution land cover data to better target riparian restoration efforts for maximum sediment pollution reduction

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

* 94. In the past decade, which of the following types of multi sector approaches for nutrient and sediment reduction, if any, do you recall having heard about? Check all that apply.

- Riparian conservation using decision support tools and flexible design standards
- Local, cross-sector water quality trading program
- I have not heard about any of these approaches

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

95. Thinking back to when you learned or received information about the approaches for nutrient and sediment reduction that you identified previously, what were the sources from which you received this information? Check all that apply.

- Not Applicable - I did not receive any information about the approaches
- INSR-funded grantees
- Professional membership organization
- Cooperative Extension Office
- Soil Conservation office
- Chesapeake Watershed Forum
- Chesapeake ForumPlus
- Bay-wide Stormwater Partners Retreat
- Chesapeake Agricultural Networking Forum
- Local farmers
- Local/municipal government officials and staff
- Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
- Other Non-profit conservation organization
- Other (please specify)

96. Overall, what kinds of information did you receive about the approaches for nutrient and sediment reduction that you identified previously? Check all that apply.

- Not Applicable - I did not receive any information about the approaches
- Information that describes the practice/approach
- Information about how to adopt the practice/approach (e.g., "How to" manuals or guides; training)
- Information about the successes associated with the practice/approach
- Information about the challenges associated with the practice/approach
- Information about outcomes associated with the practice/approach (e.g., reductions, improved water quality)

97. Again, thinking back to when you heard or received information about the innovative approaches for nutrient and sediment reduction that you identified previously, in what format(s) did you receive this information? Check all that apply.

- Not Applicable - I did not receive any information about the approaches
- Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
- Articles in peer-reviewed journals (printed and/or online)
- Articles in professional journals (e.g., Bay Journal)
- Fact sheets (printed and/or online)
- Manuals or guides (printed and/or online)
- Educational videos
- Informational webinars (not training webinars)
- Advertising and news media (e.g., newspapers, radio, TV)
- Social media (e.g., Facebook, YouTube, Twitter)
- Presentations at professional conferences
- Presentations at academic conferences
- Presentations at meetings (e.g., for local government or organizations)
- In-person trainings/workshops
- Online and/or computer-assisted trainings/workshops
- Public events (e.g., tours for public)
- Information posted in public spaces (e.g., signage, fliers)
- Other (please specify)

98. *In general*, when you are looking for or receiving information to inform your decisions about approaches to nutrient and sediment reduction, what are your top three preferred sources of information? Please rank order **your top three preferred sources of information** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (e.g., Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin [ICPRB], Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

99. *In general*, when you are looking for or receiving information to inform your decisions about nutrient and sediment reduction, what are your top three preferred formats for receiving this information? Please rank order **your top three preferred formats of information** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
<input type="text"/>	Articles in peer-reviewed journals (printed and/or online)
<input type="text"/>	Articles in professional journals (e.g., Bay Journal)
<input type="text"/>	Fact sheets (printed and/or online)
<input type="text"/>	Manuals or guides (printed and/or online)
<input type="text"/>	Educational videos
<input type="text"/>	Informational webinars (not training webinars)
<input type="text"/>	Advertising and news media (e.g., newspapers, radio, TV)
<input type="text"/>	Social media (e.g., Facebook, YouTube, Twitter)
<input type="text"/>	Presentations at professional conferences
<input type="text"/>	Presentations at academic conferences
<input type="text"/>	Presentations at meetings (e.g., for local government or organizations)
<input type="text"/>	In-person trainings/workshops
<input type="text"/>	Online and/or computer-assisted trainings/workshops
<input type="text"/>	Public events (e.g., tours for public)
<input type="text"/>	Information posted in public spaces (e.g., signage, fliers)

100. As an intermediary, what have you or your organization done to disseminate information about the INSR-funded approaches to nutrient and sediment reduction that you identified? Check all that apply.

- Posted information about approaches on a website
- E-mail blasts about approaches to individuals, groups, and/or organizations
- Professional meetings (e.g., workgroups, staff meetings, conversations with colleagues)
- Conducted webinars
- Presented at academic conferences
- Presented at professional conferences
- Participated in forums (e.g., Chesapeake Watershed Forum)
- Provided in-person trainings/workshops
- Provided online and/or computer-assisted trainings/workshops
- Used social media (e.g., Facebook, YouTube, Twitter)
- I have not / my organization has not disseminated information about INSR-funded approaches to nutrient and sediment reduction.
- Other (please specify)

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* 101. As an intermediary, do you or does your organization seek to motivate individuals or other organizations to protect the Chesapeake Bay and/or local waters?

- Yes
- No

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

102. From the list below, please choose which ONE factor has, in general, been most effective for your organization in motivating others (groups or individuals) to adopt approaches for nutrient and sediment reduction?

- Providing information, training, and/or education
- Providing hands-on, active experiences
- Strengthening relationships with community and other stakeholders through collaboration
- Using normative messages (i.e., messages relating to other successes) to motivate others' actions
- Providing incentives (direct or indirect)
- Making connections between human welfare and the environment (e.g., relating health of the Bay to people's own well-being)
- Other (please specify)

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103. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred sources of information? **Please rank order your top three preferred sources of information** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Professional membership organization
<input type="text"/>	Cooperative Extension Office
<input type="text"/>	Soil Conservation office
<input type="text"/>	Chesapeake Watershed Forum
<input type="text"/>	Chesapeake ForumPlus
<input type="text"/>	Bay-wide Stormwater Partners Retreat
<input type="text"/>	Chesapeake Agricultural Networking Forum
<input type="text"/>	Local farmers
<input type="text"/>	Local/municipal government officials and staff
<input type="text"/>	Non-profit technical assistance providers (Alliance for the Chesapeake Bay, Center for Watershed Protection, Interstate Commission for Potomac River Basin, Chesapeake Bay Foundation, Chesapeake Stormwater Network, Reefs to Ridges, Wetlands Watch)
<input type="text"/>	Other Non-profit conservation organization

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104. *In general*, when you are looking for or receiving information to inform your decisions about whether or not to adopt approaches to nutrient and sediment reduction, what are your top three preferred formats for receiving this information? **Please rank order your top three preferred information formats** with 1 = the most preferred, 2 = the second most preferred, and 3 = the third most preferred.

<input type="text"/>	Informal communications (e.g., emails or conversations with colleagues and others, word-of-mouth)
<input type="text"/>	Articles in peer-reviewed, academic journals (printed and/or online)
<input type="text"/>	Articles in professional journals (e.g., Bay Journal)
<input type="text"/>	Fact sheets (printed and/or online)
<input type="text"/>	Manuals or guides (printed and/or online)
<input type="text"/>	Educational videos
<input type="text"/>	Informational webinars (not training webinars)
<input type="text"/>	Media (e.g., newspapers, radio, TV)
<input type="text"/>	Social media (e.g., Facebook, YouTube, Twitter)
<input type="text"/>	Presentations at professional conferences
<input type="text"/>	Presentations at academic conferences
<input type="text"/>	Presentations at meetings (e.g., for local government or organizations)
<input type="text"/>	In-person trainings/workshops
<input type="text"/>	Online and/or computer-assisted trainings/workshops
<input type="text"/>	Public events (e.g., tours for public)
<input type="text"/>	Information posted in public spaces (e.g., signage, fliers)

105. *In general*, what factors influence whether you adopt an approach to reduce nutrient and sediment pollution? Please rank order all that apply with 1 being the most influential.

<input type="text"/>	If others in my community are also adopting approaches
<input type="text"/>	If the approach is recommended to me by a university, cooperative extension staff, or other technical expert
<input type="text"/>	If the approach is recommended to me by a federal, state, or local government source
<input type="text"/>	If the approach is recommended to me by family, neighbors, or friends
<input type="text"/>	Level of ease and effort that it would take to adopt the approach
<input type="text"/>	How widespread the approach is
<input type="text"/>	Evidence of effectiveness of the approach
<input type="text"/>	Cost-benefit or cost-effectiveness of the approach
<input type="text"/>	Resources needed for the approach
<input type="text"/>	Availability of financial support or incentives
<input type="text"/>	Political/institutional factors

Survey of Nutrient and Sediment Reduction Approaches in the Chesapeake Bay Watershed

You have completed the survey! Thank you so much for your time.

APPENDIX F

SURVEY RESULTS:

DISSEMINATION AND ADOPTION

Adoption

Adopters: Process of adoption and site information

Non-grantee adopters were asked how far they got in the process of adopting their selected primary approach. Most respondents indicated that they were in the later stages of adoption. Almost 18% of respondents (n=3) have started to implement the approach and are continuing to work toward full implementation, 35% of respondents (n=6) have fully implemented the approach, and 47% of respondents (n=8) have sustained the approach (Figure F-1).

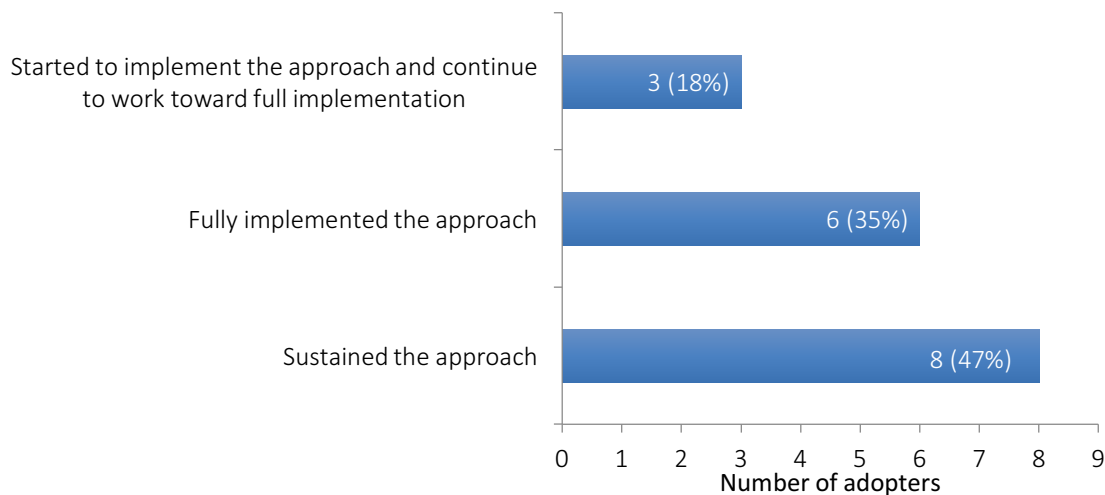


FIGURE F-1. Degree to which non-grantee adopters have implemented their primary adopted approach (n=17)

Adoption by non-grantee groups watershed groups

Non-grantee Bay watershed groups reported adopting 95% (70 out of 74) types of INSR-funded innovative practices or approaches for nutrient and sediment reduction.

Agricultural approaches: Use of combined on-farm and stream corridor practices was the most-adopted agriculture approach (n=11 adopters). Use of a watershed-scale approach to agricultural nutrient reduction (n=10 adopters); use of integrated programs to promote nutrient reduction strategies (n=9 adopters); connecting water quality improvements to food system sustainability (n=8 adopters), and use of trained resource teams and decision support tools for nutrient management (n=8 adopters) were also frequently reported adopted practices. Taken together, non-grantee adopters reported a combined total of 122 instances of adopted INSR agricultural approaches.

Stormwater approaches: Promotion and/or adoption of low-impact design and retrofits was the most frequently reported adopted stormwater approach by other watershed groups (n=13 adopters). Other

top adopted stormwater approaches included adoption of a watershed scale program or approach to stormwater management; use of green infrastructure in highly visible, high-traffic locations, and installations of connected stormwater BMPs (n=9 adopters each). Non-grantee adopters reported a combined total of 158 instances of adopted INSR stormwater approaches.

Habitat Restoration approaches: The most frequently reported adopted habitat restoration approach was use of natural stream restoration methods for sediment reduction (n=17 adopters), with use of volunteers for buffer maintenance (n=14 adopters) and the use of buffer restoration planting alternatives, including natural regeneration, direct seeding, and/or live staking (n=13 adopters) also popular choices. Non-grantee adopters reported a combined total of 116 instances of adopted INSR habitat restoration approaches.

Multi-sector approaches: Of the two multi-sector INSR-funded approaches, just one was adopted by non-grantees, the use of local, cross-sector water quality trading program (n=9 adopters). Though just over half of respondents were aware of the other multi-sector approach – riparian conservation using decision support tools and flexible design standards – none reporting having adopted the approach.

Septic Systems approaches: Five out of 30 adopters reported adopting the INSR-funded innovation of increasing septic system upgrades through creative financial incentives, with just over a third of non-grantee respondents reporting being aware of this approach.

Consideration of adoption of innovative practices in the context of clustered INSR site locations and related dissemination

Clusters of adopted INSR practices in certain areas correspond with regions in which dissemination of INSR-funded practices and approaches was concentrated and sustained over time by multiple INSR-funded grantee organizations. These areas include the areas of Lancaster, PA; Shenandoah Valley region of VA; the Washington, DC, metro area, and areas of north central Pennsylvania. Adoption of INSR approaches in these areas as reported by survey respondents (main report - Figure 5) provides evidence for uptake of INSR-funded practices in areas where investments in dissemination and other forms of information sharing have been made by INSR grantee organizations.

Lancaster, PA

Dissemination of INSR-funded practices was supported and sustained in the Lancaster, PA, region via six INSR grants starting in 2010 and continuing through grant year 2015 (the conclusion of INSR grant years included in this evaluation). Survey results show that grantees reported six sites in the Lancaster area where INSR practices have been adopted (beyond those funded by INSR grants) (main report - Figure 5). These practices included implementation of whole-farm conservation systems in three locations and adoption of low-impact design and retrofits for stormwater management in three locations.

Dissemination activities in the Lancaster area from INSR grantees included a diverse mix of the dissemination activities, events, and approaches previously described, focusing on:

- Stormwater management demonstrations in and for the City of Lancaster;
- Awareness raising efforts around the City of Lancaster’s green infrastructure (GI) plan and institutionalization of GI across many other PA municipalities;
- Disseminating results from demonstration farms to animal farm operators across Pennsylvania;
- Comprehensive agricultural stewardship in Lancaster county, with focus on forest buffers and nutrient trading, among other topics;
- Municipal outreach and dissemination of a model to Lancaster county municipalities on going beyond baseline compliance; and
- Presentations and education to wide ranging audiences on diverse aspects of farm stewardship.

Reported sites of adoption are underestimated (main report - Figure 5) based on reported adoption by survey respondents for which no specific location data was received. In addition, other adoption sites reported and shown in Figure 5 (of main report) include 13 specific sites in other areas of Pennsylvania, plus additional sites ‘throughout Pennsylvania’ (reported without specific location information) for which Lancaster-based dissemination efforts may have reached via state-wide disseminations efforts of some activities and events.

Shenandoah Valley region, VA

Dissemination of INSR-funded practices was supported and sustained in the Shenandoah Valley region of Virginia via seven INSR grants starting in 2009 and continuing through 2015. Survey results show that grantees reported a total of five sites in the Shenandoah Valley, and additional sites east and west of the Valley where INSR practices have been adopted (beyond those funded by INSR grants) (main report - Figure 5). These practices were largely agricultural sector approaches and included:

- Increasing agricultural best management practice adoption and implementation by connecting water quality improvements to food system sustainability (Shenandoah Valley and east of Shenandoah Valley);
- Increasing agricultural best management practice adoption and implementation by engaging absentee landowners (Shenandoah Valley);
- Use of green infrastructure in highly visible, high-traffic locations (west of Shenandoah Valley); and
- Watershed scale stormwater management: Adoption of a watershed scale program or approach for stormwater management (west of Shenandoah Valley)

Dissemination activities in the Shenandoah Valley area from INSR grantees included a diverse mix of the dissemination activities, events, and approaches previously described, but focusing on:

- Use of local media and social media to communicate cost share funding options, alternative approaches to stream exclusion, fertilizer application, and forage production systems, including individual stories from farmers to share how cost share programs have influenced their operations and economics;

- Communications and publications on integrating water quality protection into the food system, using Shenandoah Valley experiences as examples;
- Delivery of information to growers and other industry and natural resource agency personnel on the environmental and cost-effectiveness of various ammonia reduction strategies from poultry house emissions;
- Local community engagement in agricultural stewardship, including cost share and grazing information;
- Demonstration field days and classroom workshop events focused on dairy manure injection techniques;
- Outreach focused on aquatic conservation of the Potomac and Shenandoah headwaters, focusing on stream and brook trout conservation; and
- Comprehensive watershed conservation in agricultural and livestock landscapes.

While there is no clear or specific alignment between reported sites of adopted INSR practices and dissemination in the Shenandoah Valley area cluster, it is important to keep in mind that the range and volume of dissemination activities funded by INSR projects is wide and high, while the number of locations of reported practices is significantly underrepresented in Figure 5 (main report) based on the number of total practices adopted by survey respondents alone (72/74).

Washington, DC, metro region

Dissemination of INSR-funded practices was supported and sustained in the Washington, DC, and surrounding region via six INSR grants starting in 2009 and continuing through grant year 2015. Survey results show that grantees reported four sites in the Washington, DC, area, and three sites in Annapolis, MD, where INSR stormwater, habitat restoration, and multi-sector practices have been adopted (main report - Figure 5). Adopted practices with reported location information included:

- Use of natural stream restoration methods for sediment reduction;
- Riparian conservation using decision support tools and flexible design standards;
- Low-impact design and retrofits: Promotion and/or adoption of low-impact design practices and/or retrofits;
- Use of “pay for performance” incentives in public conservation programs to maximize nutrient reductions; and
- Non-traditional partnerships for stormwater management and green infrastructure and development of social engagement and urban conservation for stormwater management.

Dissemination activities in the Washington, DC, area from INSR grantees included a diverse mix of the dissemination activities, events, and approaches previously described, focusing on:

- A multi-media campaign and materials for behavior change support stormwater management practices;
- Chesapeake Bay Stormwater Training Partnership training modules, events and workshops focused on Maryland, West Virginia, and District of Columbia, to also adapt and disseminate Bay-wide;

- Dissemination via media and conferences on green roof installations using fire station roofs as model stormwater management systems;
- Professional education via website, webinar, and trainings and outreach supporting green infrastructure efforts in the metropolitan Washington, DC, region and beyond;
- Mixed dissemination approaches to professionals and the public to share lessons learned on efforts to encourage resident adoption of River Smart Homes and related stream restoration practices and watershed- and sub-watershed level approaches to stream restoration; and
- Watershed restoration and sustainability program activities focused on stormwater approaches implemented in communities of Annapolis, MD, and disseminated throughout Baltimore-Washington, DC, region.

As with the Lancaster and Shenandoah Valley areas for which reported adopted practices show some amount of clustering, adopted practices in the Washington, DC, region and Annapolis, MD, are not inconsistent with the diverse dissemination activities that have taken place in those areas since 2009.

INSR-funded practices for which location data were reported are highly limited, underscoring the importance of recognizing the significant under-representation depicted by mapped site data (main report - Figure 5).

Dissemination

Types of information disseminated and received

INSR grantees disseminated various types of information about their INSR approach. The three most common types of information disseminated by grantees were: information that describes the approach (n=45, 93.8%), information about the effectiveness of the approach (n=36, 75%), and information about how the approach is innovative (n=34, 70.8%). Potential adopters and intermediaries were asked what types of information they had received about approaches to nutrient and sediment reduction, and they reported receiving similar types of information disseminated by grantees.¹ The two most common types of information they received were: successes associated with the approach (n=5, 83.3% for potential adopters) and information that describes the approach (n=40, 87% for intermediaries) (Table F-1).

TABLE F-1. Types of information disseminated by grantees and received by potential adopters and intermediaries

Types of Information Disseminated and Received	Disseminated by Grantees	Received by:	
		Potential Adopters	Intermediaries
Information that describes approach	94% (n=45)	67% (n=4)	87% (n=40)
Information about effectiveness (successes or outcomes) of approach	75%(n=36)	83% (n=5)	85% (n=39) for “successes” 70% (n=32) for “outcomes”
Information about how approach is innovative	71% (n=34)		
Information about challenges associated with approach		67% (n=4)	56% (n=26)

Dissemination practices, audiences, and preferences

INSR grantees utilized multiple dissemination strategies to communicate about their INSR approaches with the broader Chesapeake Bay Community. The most common strategies reported were: giving presentations at meetings (e.g., for local government officials or organizations) (n=43, 84.3%), giving presentations at professional conferences (41, 80.4%), and publishing fact sheets (printed and/or online) (n=40, 76.9%). The least common were publishing informational webinars (not online training or training webinars) (n=11, 21.2%), publishing articles in peer-reviewed, academic journals (printed and/or online) (n=10, 18.9%), and holding online and/or computer-assisted trainings/workshops (n=5, 9.8%) (Figure F-2).

¹ This question was not asked of adopters.

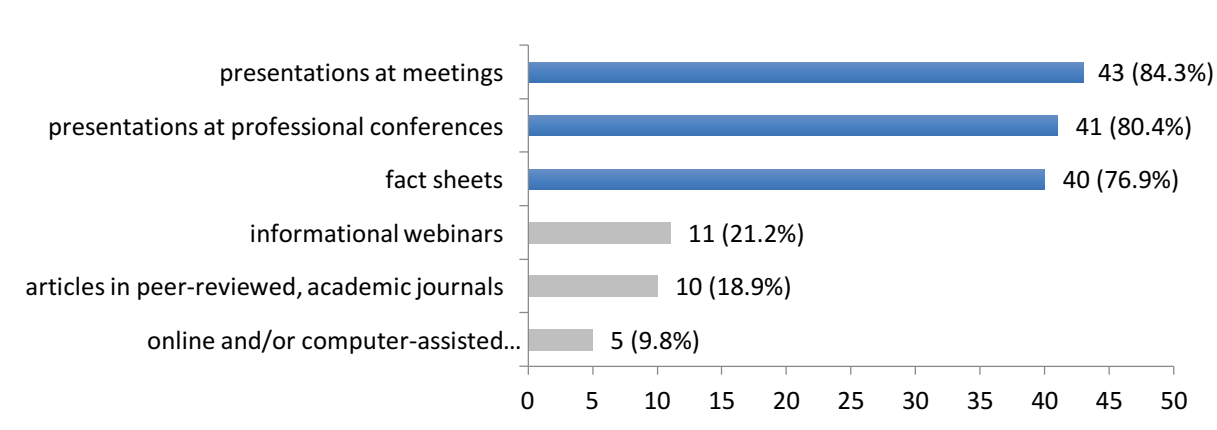


FIGURE F-2. Grantees’ most and least common dissemination activities (n=51-53)

Strength of dissemination activities in facilitating adoption

In the survey, grantees rated the extent to which their dissemination activities facilitated adoption of their INSR approaches. The dissemination activities perceived to have the strongest influence on adoption of INSR approaches were holding in-person trainings/workshops (n=37, mean=8.24, SD=1.62) and publishing online educational videos (n=16, mean=7.81, SD=1.33). Consistent with this finding, adopters also identified in-person trainings/workshops as the third most common format for receiving information about an INSR approach they adopted (n=12, 70.6%). (Table F-2.) Conversely, grantees’ perception about the utility of online education videos does not align with the ways in which adopters have received or prefer to receive information. No adopters indicated educational videos as a preference.

Grantees rated the following dissemination activities as the weakest in facilitating adoption of their INSR approaches: posting information on public spaces (n=22, mean=6.05, SD=2.05) and publishing information using advertising and news media (n=27, mean=6.04, SD=2.23). There was some alignment with adopters, who reported that the least preferred formats of information are presentations at academic conferences, advertising and news media, informational webinars, and social media (Table F-2.)

TABLE F-2. Perceptions of dissemination activities for facilitating adoption

Dissemination Activities	Grantees	Adopters
Activities Perceived as Strongest in Facilitating Adoption		
Hold in-person trainings/workshops	✓ n=37 (mean=8.24, SD=1.6)	✓ n=12 (70.6%)
Publish online education videos	✓ n=16 (mean=7.81, SD=1.33)	
Activities Perceived as Weakest in Facilitating Adoption		
Posting information on public spaces	✓ n=22 (mean=6.05, SD=2.05)	✓ n=2 (11.8%)
Publishing information using advertising and news media	✓ n=27 (mean=6.04, SD=2.23)	✓ n=1 (5.9%)

Types of information disseminated

Respondents reported the types of information about their organization’s INSR approach that have been disseminated to date. Almost 94% (n=45) reported disseminating information that describes the approach, 75% (n=36) disseminated information about the effectiveness of the approach, and 70.8% (n=34) disseminated information about how the approach is innovative. Fewer respondents disseminated information on the relative effectiveness of the innovation (e.g., cost-effectiveness) (n=28, 58.3%) or lessons learned about the approach (e.g., unexpected outcomes) (n=28, 58.3%). Even fewer disseminated “how to” manuals or guides about the approach (n=15, 31.3%) (Figure F-3).

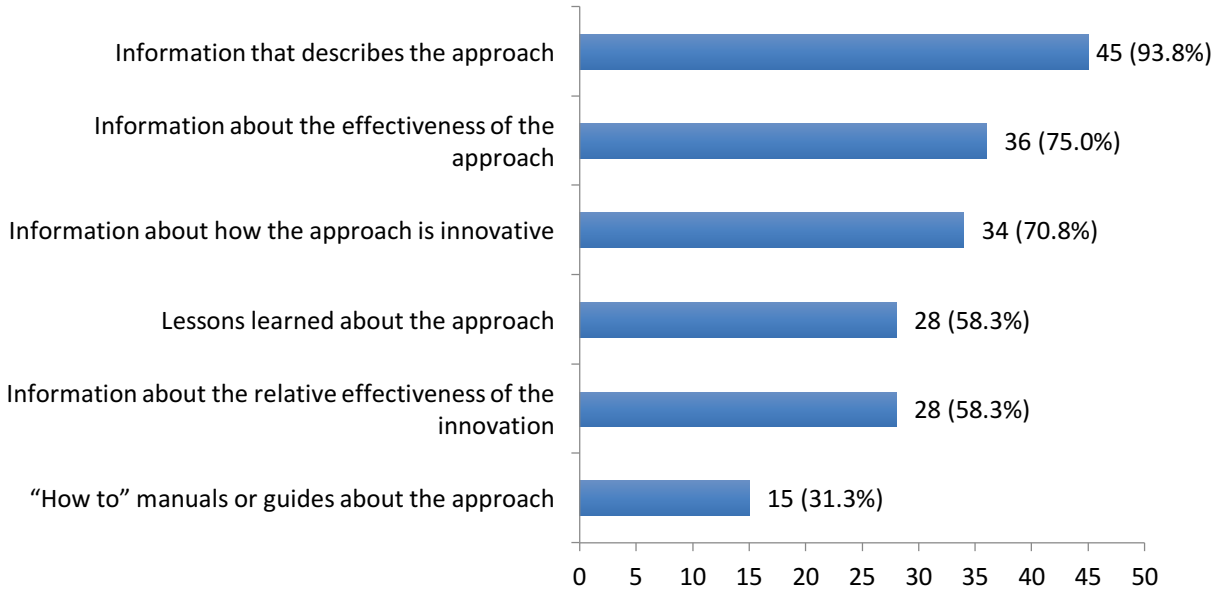


FIGURE F-3. Grantee Survey: Types of Information Disseminated (n=48)

Participation in Networking Forums

Respondents were asked if they have ever participated in four networking forums (Chesapeake Watershed Forum, Bay-wide Stormwater Partners Retreat, Chesapeake Agricultural Networking Forum, and Chesapeake ForumPlus). Then respondents were asked if their organization participated in the forum in order to disseminate information about its INSR approaches. The most popular networking forum was the Chesapeake Watershed Forum (n=30, 66.7%). Of those who participated in the forum, 70% of respondents (n=21) indicated that they participated in the forum to disseminate information on INSR approaches. The next most popular forum was the Bay-wide Stormwater Partners Retreat (n=22, 48.9%). Of those who participated in the forum, 64% of respondents (n=14) indicated that they participated in the forum to disseminate information on INSR approaches. The Chesapeake Agricultural Networking Forum was slightly less popular (n=18, 40%). The Chesapeake ForumPlus was the least popular (n=3, 6.7%) (Table F-3).

TABLE F-3. Grantee survey: Participation in networking forums

Forum	Overall participation (n=45)			Participation to Disseminate*		
	Yes	No	I'm not sure	Yes	No	I'm not sure
Chesapeake Watershed Forum	30 (66.7%)	3 (6.7%)	12 (26.7%)	21 (50.0%)	8 (19.0%)	13 (31.0%)
Bay-wide Stormwater Partners Retreat	22 (48.9%)	14 (31.1%)	9 (20.0%)	14 (43.8%)	9 (28.1%)	9 (28.1%)
Chesapeake Agricultural Networking Forum	18 (40.0%)	18 (40.0%)	9 (20.0%)	11 (39.3%)	7 (25.0%)	10 (35.7%)
Chesapeake ForumPlus	3 (6.7%)	23 (51.1%)	19 (42.2%)	0 (0%)	4 (18.2%)	18 (81.8%)

* n's are different for each forum and are based on those who participated to disseminate

APPENDIX G

INTERVIEW QUESTIONS

Interview Questions—INSR Grantees

1. **GOALS/CONTEXT OF APPROACH** We reviewed the proposal and final report for the INSR project [title of project], funded in [YEAR] and was completed in [YEAR]. To start our conversation, we would like for you to provide a little background by describing the primary innovative aspect of this project from your perspective. What did the project set out to achieve and was it successful?
2. **INNOVATION:** Let's talk a bit more about innovation specifically. In what ways do you consider this approach innovative?
3. **EFFECTIVENESS/COST-EFFECTIVENESS:** How effective, in the end, do you feel your project's approach was for reducing [nutrients/sediment]? Where did the approach succeed, technically? Are there ways in which the approach fell short?
4. **MOST IMPORTANT CONTRIBUTIONS:** Could you describe, outside of the confines of the NFWF reporting structures and metrics, what you think was (or were) the most important contribution/s of the project? [Please describe].
5. **FACTORS FOR SUCCESS:** Did any of the strategies or activities that were implemented as part of this approach stand out as particularly successful in facilitating your work to achieve the intended outcomes? [Please describe]
6. **CHALLENGES AND OVERCOMING CHALLENGES:** How would you describe the challenges you faced in this project related to this approach?
7. **DISSEMINATION/AUDIENCES:** Now let's shift to communication and dissemination activities for a bit. We reviewed the project dissemination activities reported in your final report [brief summary of dissemination activities here]. How would you describe the ways in which your approach has been shared with the broader Bay community?
8. **ADOPTION OF INNOVATIVE APPROACHES:** To what extent are you aware of other organizations that have adopted or are using this approach? And how did you become aware of those groups' work?
9. **FINAL COMMENTS** Is there anything we have not yet discussed that you think would be important for us to know as we evaluate NFWF's INSR program?

Interview Questions—Other Watershed Groups

1. **GOALS/CONTEXT OF APPROACH** First, we would like for you to provide a little background by describing the water quality and/or nutrient or sediment reduction issue(s) your organization is focused on and, briefly, the approaches your group has traditionally used to address them.
2. **AWARENESS/INFO PREFERENCES:** How did you first become aware of or learn about the new approach you tried? From whom or what sources did you receive information about it?
3. **ADOPTION:** Could you describe the types of factors that you took into consideration as you were/are considering adopting or trying this approach?
4. **CHALLENGES AND OVERCOMING CHALLENGES:** How would you describe the challenges associated with adopting [or as you attempted to adopt] this approach?
5. **INNOVATION:** Let's talk a bit more about innovation specifically. To what extent do you consider this approach to be innovative?
6. **EFFECTIVENESS/COST-EFFECTIVENESS:** How effective do you feel this approach is for reducing [nutrients/sediment]? Did your [do you expect your] approach [to] succeed, technically? Are there ways in which the approach fell short, or is expected to fall short?
7. **FACTORS FOR SUCCESS:** Did any of the strategies or activities that were implemented as part of this approach stand out as particularly successful in facilitating your work to achieve the intended outcomes? [Please describe]
8. **DISSEMINATION/AUDIENCES:** Now let's shift to the topic of communication and dissemination for a bit. How would you describe the ways in which you have shared information about this approach with others?
9. **ADOPTION OF INNOVATIVE APPROACHES BY OTHERS:** To what extent are you aware of other organizations that have adopted or are using this approach? And how did you become aware of those groups' work?
10. **FINAL COMMENTS** Is there anything we have not yet discussed that you think would be important for us to know as we evaluate nutrient and sediment reduction approaches associated with NFWF's INSR program?