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

Presentation to the
Chesapeake Bay Program Management Board
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INSR Evaluation Purpose

To understand:

1) What **water quality improvements** have been made in terms of estimated nutrient and sediment load reductions

2) Which approaches are **most effective** and **most innovative**

3) What effect **clustering** of INSR projects in targeted areas has had, both on estimated load reductions and on dissemination and adoption

4) Extent to which INSR approaches have been **adopted by others** in the Bay watershed

5) How information about INSR approaches has been **shared with the broader Chesapeake Bay community**

Evaluation Scope and Methods

❖ Scope: 118 projects funded 2009 –2015
❖ Document Review
- Focus on 52 completed INSR projects (2009-2012)
- INSR grantee proposals and Final Reports

❖ Online surveys
- Including all 118 project grantees
- Other Bay partners (non-grantees)

❖ Water quality modeling using BayFAST
- Included model-able completed INSR projects 2009-2012
- Peer-reviewed by expert panel

❖ Interviews
- INSR grantees
- Non-grantee adopters, potential adopters, and 'intermediaries'

NFWF INSR Evaluation Findings

Water Quality Findings

Water Quality Findings

TOTAL NFWF REDUCTIONS & % TMDL CONTRIBUTIONS	NITROGEN Reduction	PHOSPHORUS Reduction	SEDIMENT Reduction
	(lbs.)	(lbs.)	(lbs.)
AG	322,542	12,685	14,330,540
AG&FOREST	34,955	300	655,365
AG&URBAN	5,387	401	244,068
FOREST	784	615	422,554
URBAN	3,513	705	353,711
URBAN&FOREST	1,889	202	120,826
Overall Total Reductions (lbs.)	369,070	14,908	16,127,064
NFWF % Contribution to 2009-2012 TMDL Reduction (All Sources)	2.40%	1.19%	3.74%
NFWF % Contribution to 2009-2025 TMDL Reduction (All Sources)	0.54%	0.31%	1.21%

Water Quality Findings

➤ INSR projects are contributing to progress toward Bay-wide goals

Leading BMPs in projects yielding highest reductions (lbs.) in:	Nitrogen	Phosphorus	Sediment	N, P, and sediment
Conservation planning	✔	✔	✔	✔
Conservation tillage			✔	✔
Cover crops	✔			✔
Nutrient management	✔	✔		
Pasture management	✔	✔	✔	✔

➤ Urban practices contributed lower reductions though **bioretention** and **pervious pavement** yielded notable phosphorus reductions in some locations.
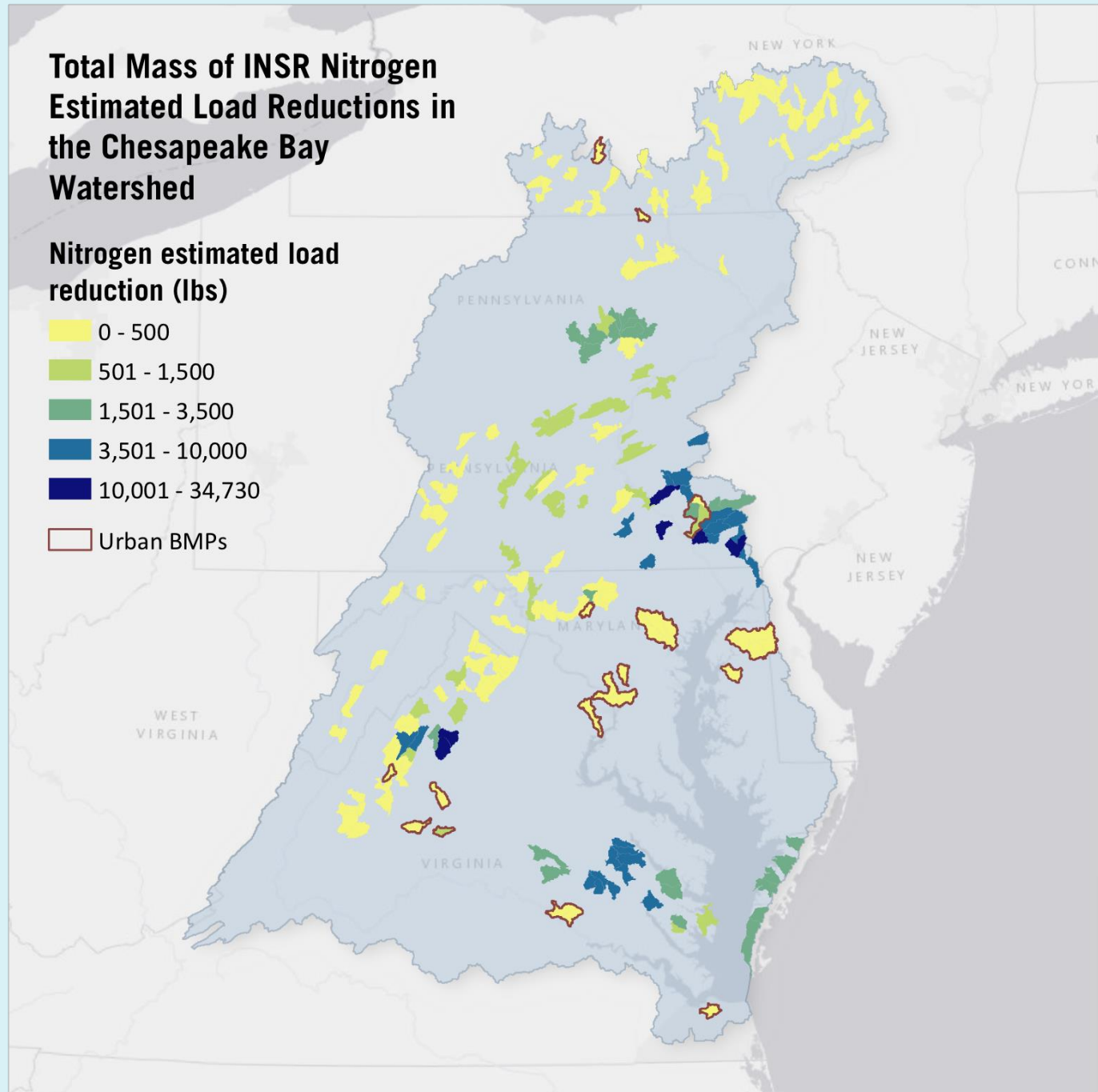
Nitrogen
Estimated load reductions (total mass in lbs.)

Total Mass of INSR Nitrogen Estimated Load Reductions in the Chesapeake Bay Watershed

Nitrogen estimated load reduction (lbs)
- 0 - 500
- 501 - 1,500
- 1,501 - 3,500
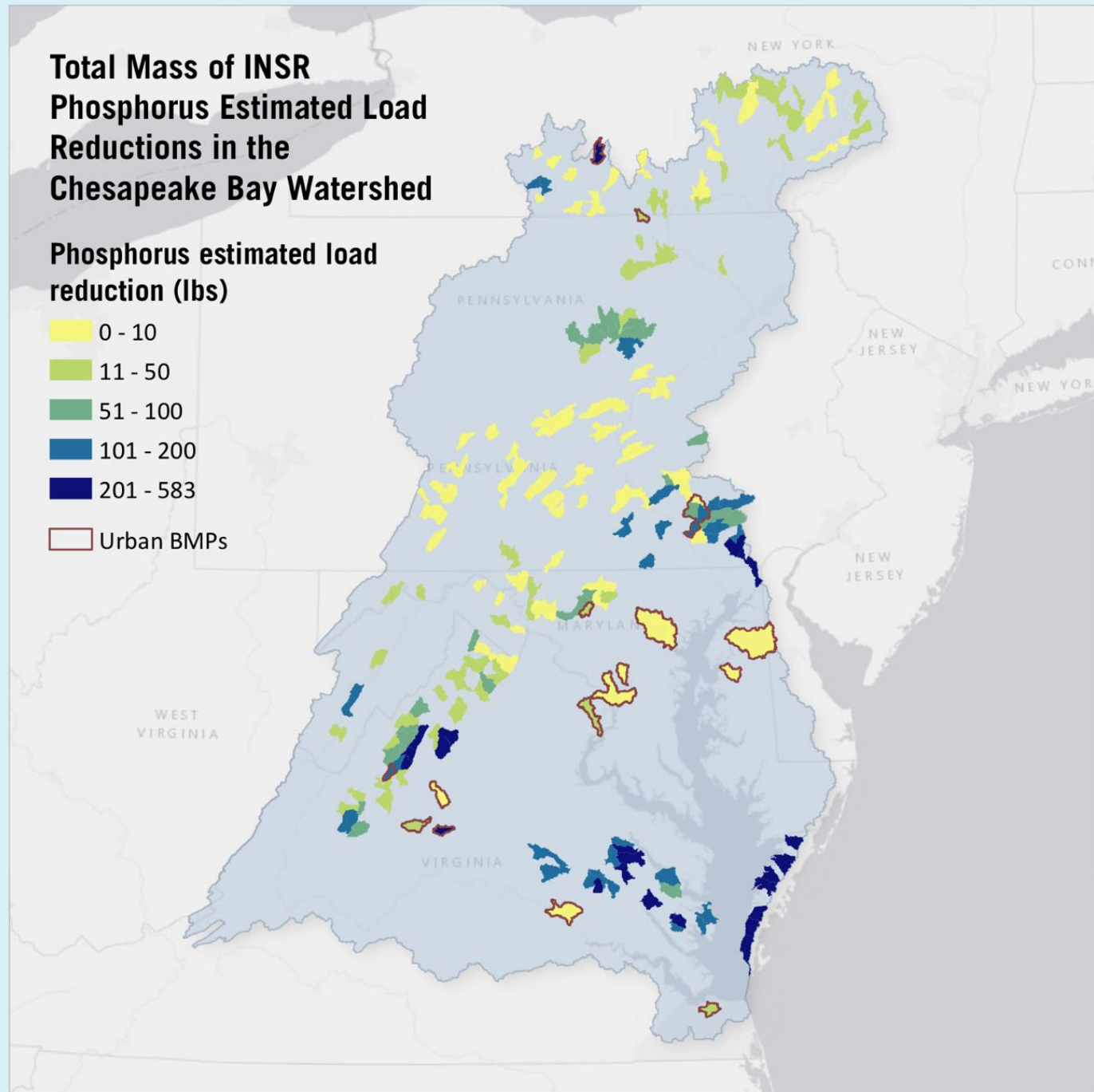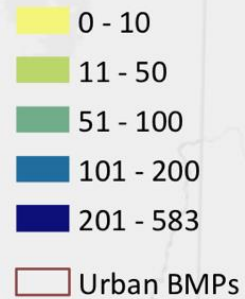- 3,501 - 10,000
- 10,001 - 34,730
- Urban BMPs

Phosphorous
Estimated load reductions (total mass in lbs.)

Total Mass of INSR Phosphorus Estimated Load Reductions in the Chesapeake Bay Watershed

Phosphorus estimated load reduction (lbs)
- 0 - 10
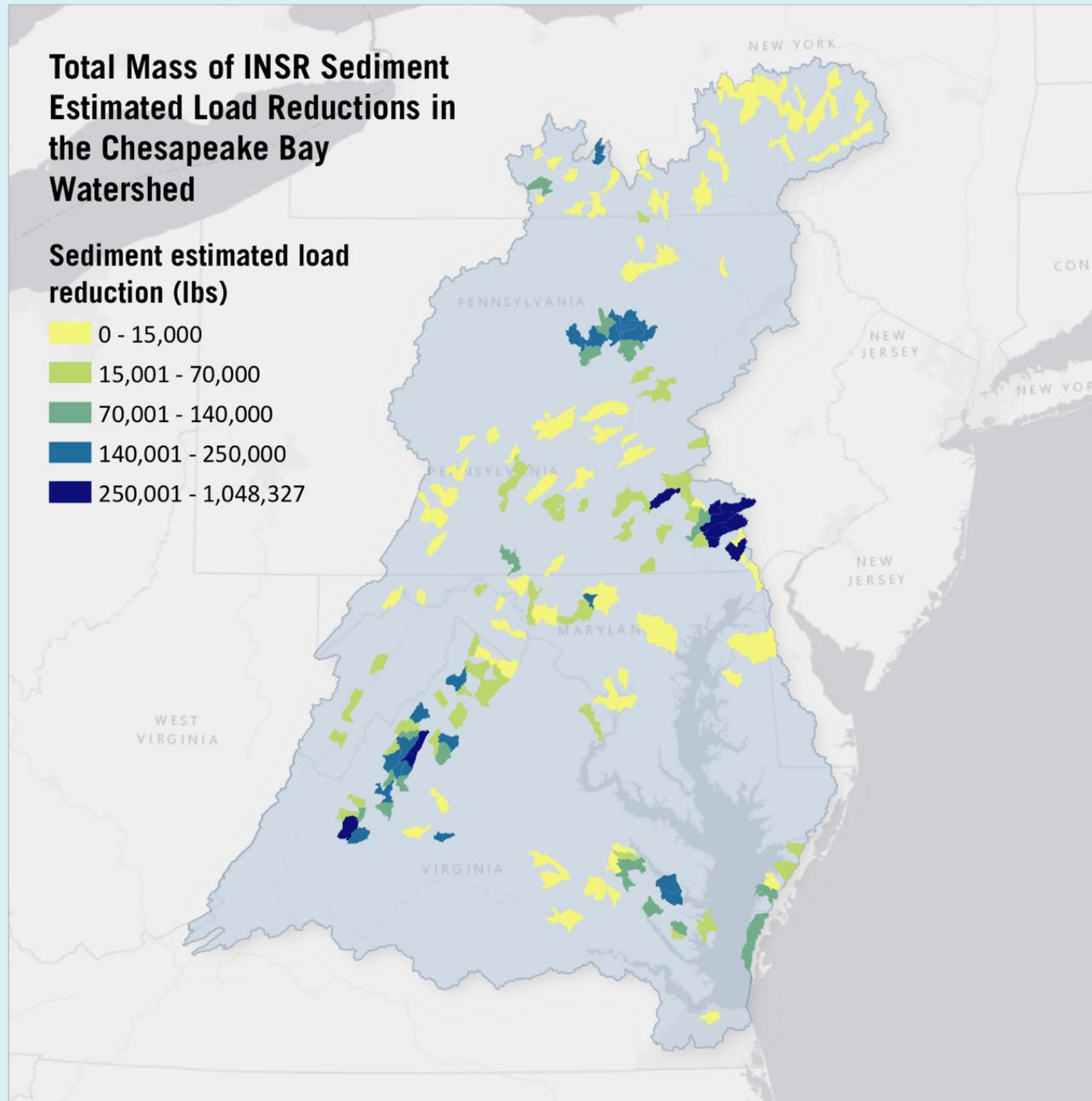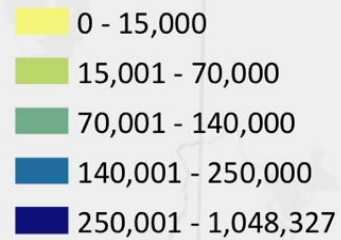- 11 - 50
- 51 - 100
- 101 - 200
- 201 - 583
- Urban BMPs

Sediment
Estimated load reductions (total mass in lbs.)

Total Mass of INSR Sediment Estimated Load Reductions in the Chesapeake Bay Watershed

Sediment estimated load reduction (lbs)
- 0 - 15,000
- 15,001 - 70,000
- 70,001 - 140,000
- 140,001 - 250,000
- 250,001 - 1,048,327

Most effective & innovative INSR approaches

❖ Agriculture:
  - Community-based manure composting
  - Farmer-to-farmer mentoring and new approaches for working with the Plain Sect community
  - Supply-chain-based nutrient reduction among poultry and dairy farms in the Shenandoah Valley

❖ Stormwater:
  - Subsoiling & soil amendments for compact urban soils
  - Increased coordination among local governments for stormwater financing
  - Low-impact development and retrofits

❖ Habitat:
  - Turf to trees and natural stream restoration

❖ Multi-sector:
  - Watershed-scale coordination
  - Local water quality trading (Lycoming County, PA)

NFWF INSR Evaluation Findings
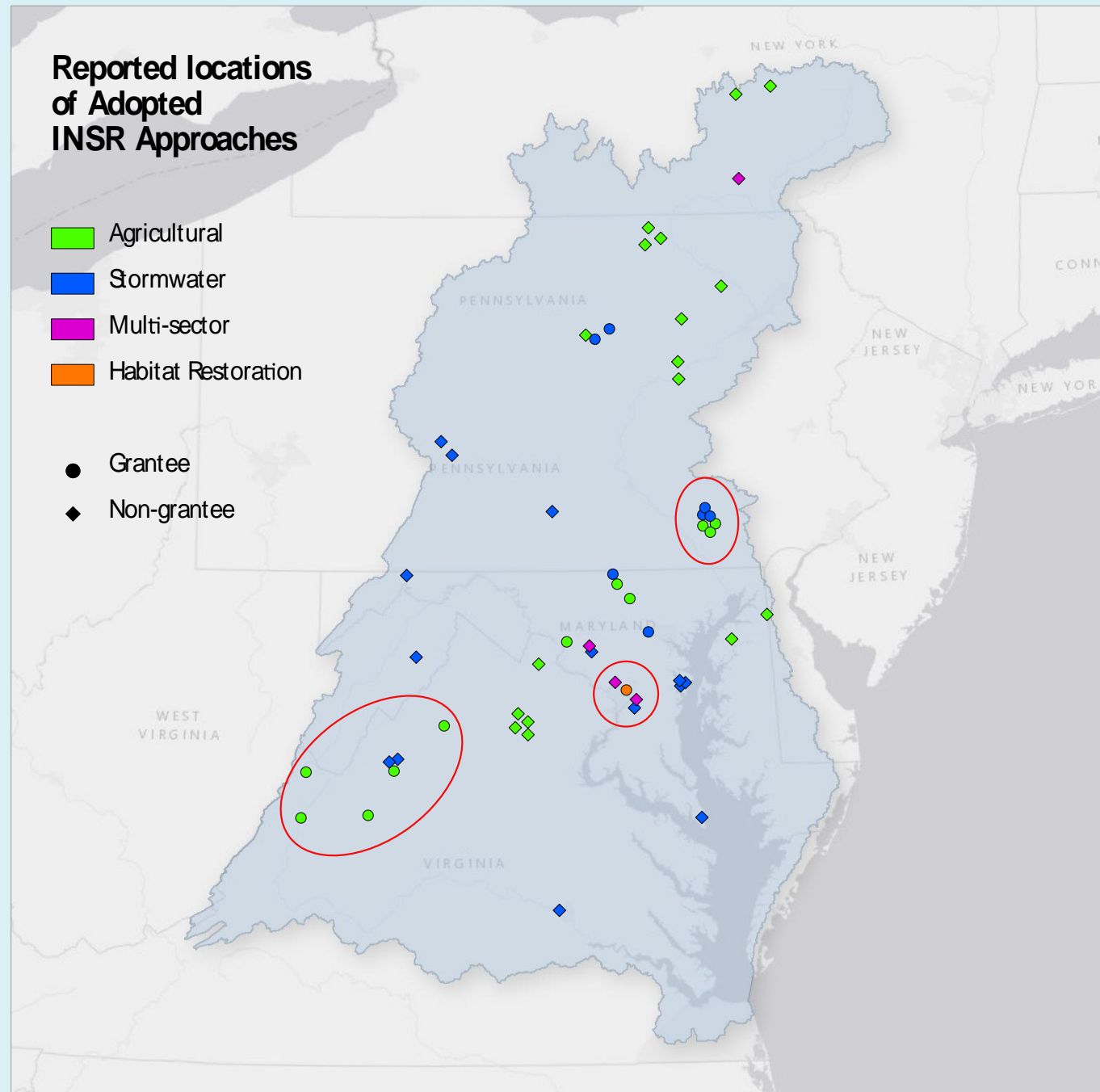
Dissemination and Adoption

Adoption of INSR practices and approaches

- ❖ Adoption rate is over 95%
- ❖ 568 instances of INSR adoption reported in > 2,000 locations
- ❖ Most (82%) were fully implemented and/or sustained

Reported adoption

Clustering fosters adoption

- Shenandoah Valley, VA
- Washington, DC region
- Lancaster, PA

Reported locations of Adopted INSR Approaches

- 🟩 Agricultural
- 🟦 Stormwater
- 🟪 Multi-sector
- 🟧 Habitat Restoration

- ● Grantee
- ◆ Non-grantee

Factors influencing adoption

- ❖ Evidence of technical effectiveness
- ❖ Evidence of cost-effectiveness
- ❖ Recommendation by government entities
- ❖ Information sharing and clustered dissemination

Information sharing

- ❖ Relationships and trust very important (peer-to-peer)
- ❖ Adopters value informal communications for learning about innovation practices
- ❖ Grantees frequently share information through more formal presentations
- ❖ Grantees value Chesapeake Bay Watershed networking Forums as a way to exchange learnings
- ❖ Both grantees and non-grantees prefer the use of fact sheets, guidance documents and manuals for information sharing

We need farmers who are leaders in the community. If the farmer says a practice is successful, other farmers will follow suit.

--INSR adopter

Factors challenging implementation

- ❖ Lack of financial resources
- ❖ Competing priorities
- ❖ Lack of buy-in and support from others
- ❖ Federal, state/ and local government support
- ❖ Time constraints often associated with permits
- ❖ Continued funding for monitoring

Recommendations based on water quality modeling

1) Consider multiple program goals (e.g., effectiveness, innovation) in grantmaking and project siting

2) Coordinate standardized collection of project information to better standardize estimated load reductions

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

Recommendations for information sharing and encouraging adoption

1) Continue to cluster projects to foster adoption in priority areas

2) Continue to develop, leverage, and support partnerships to facilitate dissemination and adoption

3) Further engage the Bay Community by expanding Forum opportunities

4) Continue to provide or support the development of materials that further the dissemination of INSR approaches

5) Continue to support networking activities that maximize informal communication as a means of sharing information