



# Evaluating Ecological and Community Resilience Benefits from DOI's Hurricane Sandy Program



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# Hurricane Sandy Evaluation Approach



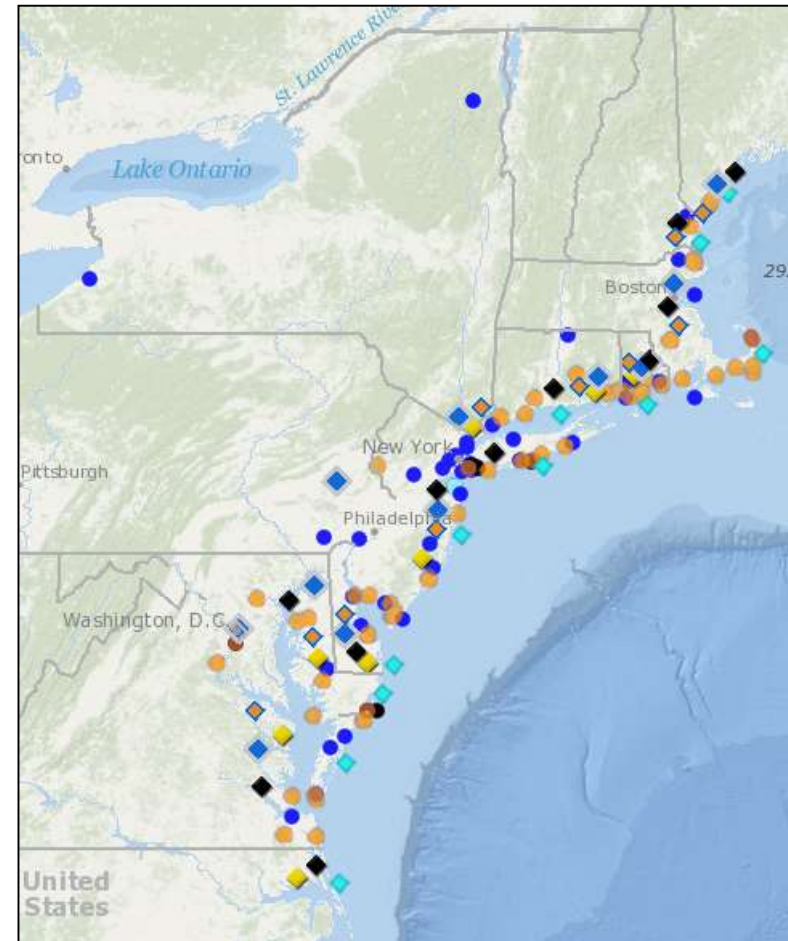
**Project Implementation: 2013-2018**

**Core Metrics Established: 2015**

**Phase I Evaluation: June '16 - April '18**

**Long(er)-term Monitoring: 2017-2023**

**Phase II Evaluation: Dec. '22 – Dec. '23**







# Phase I Evaluation: Impact



- **To what extent did projects do what they said they were going to do?**
- **What ecological benefits were realized individually and collectively?**
- **What socioeconomic benefits were realized individually and collectively?**
- **How cost effective were the resilience activities in achieving ecological and socioeconomic resilience benefits?**





# Phase I Evaluation: Six Case Studies



1. Regional benefits from projects concentrated in targeted geographies
2. Benefits of scientific data and tools
3. Ecological benefits of priority restoration activities
  - ✓ marsh hydrology restoration
  - ✓ beach and dune restoration
  - ✓ living shoreline restoration
4. Impact of community resiliency planning
5. Resilience benefits of dam removals and culvert replacements
6. Cost effectiveness of green vs. gray infrastructure



# Case Study #4: Community Resilience Planning



To what extent have planning projects impacted community awareness?

To what extent have they led to on-the-ground action to improve resilience?



City of Hoboken, NJ - Transforming Hoboken's Block 12 into a Green Infrastructure Asset (NJ)





# Case Study #5:

## Aquatic connectivity and flood resilience



To what extent have dam removal and culvert replacement projects led to improved ecological and social resilience outcomes?



MA Fish & Game Division of Ecological Restoration – Turner Dam

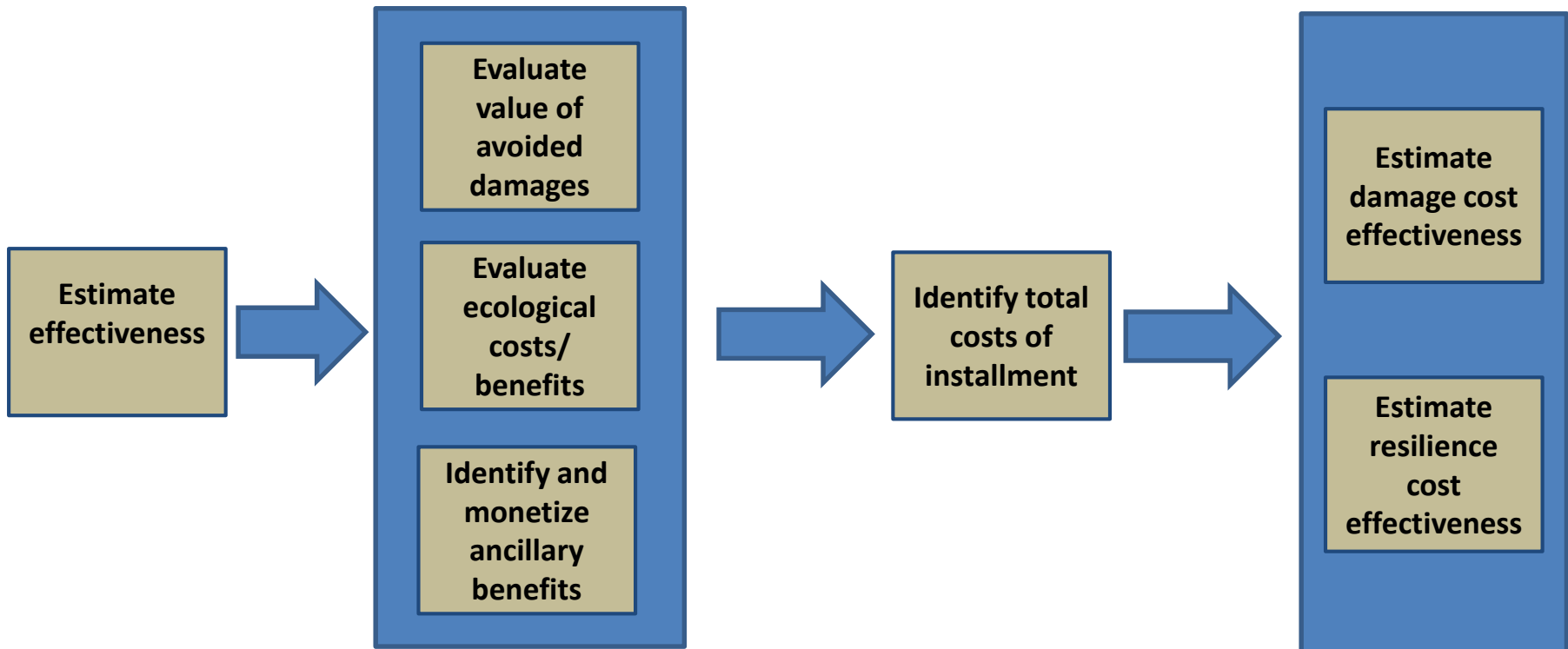


# Case Study #6: Cost Effectiveness of Green vs. Gray Infrastructure



What is the cost-effectiveness of green infrastructure compared to gray infrastructure alternatives for reducing flooding?

## Evaluation steps:





# Long(er)-term Monitoring: 2017-2023



Marsh Restoration Projects (19)



Beach and Dune Restoration Projects (8)



Aquatic Connectivity Projects (9)



Living Shoreline Projects (8)







# Timeline of Evaluation Products Available to the Public



- ✓ **Core Ecological Metrics of Resilience (available)**
- ✓ **Core Socioeconomic Metrics of Resilience (available)**
- **Resilience Monitoring Database (Dec. '17)**
- **Phase I Evaluation w/Seven Case Studies (April '18)**
- **5-7 Years of Monitoring Data (annually 2017-2023)**
- **Phase II Evaluation (Dec. '23)**

[www.nfwf.org/hurricanesandy](http://www.nfwf.org/hurricanesandy)

[www.doi.gov/hurricanesandy](http://www.doi.gov/hurricanesandy)



# Final Thoughts

***“If resilience is built through a project, and no perfect resilience metric is around to measure it, does it have an impact?”***

***Anonymous, National Adaptation Forum, St. Louis, MO 2015***

