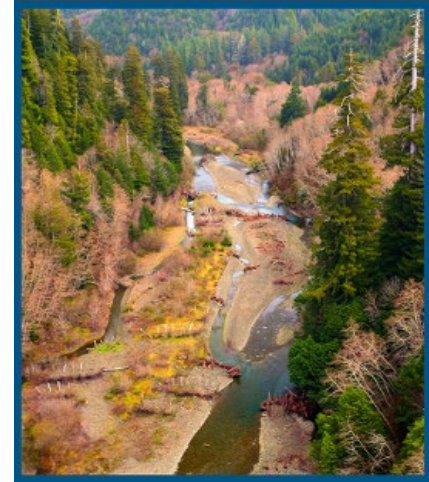
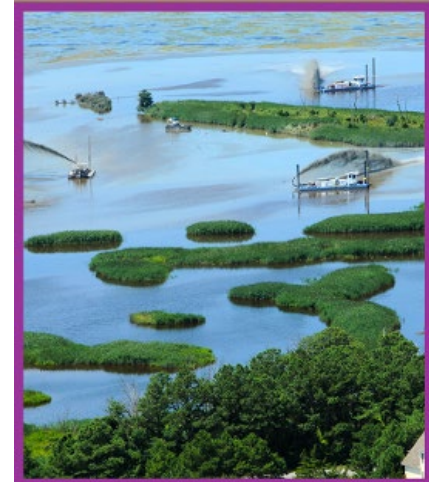
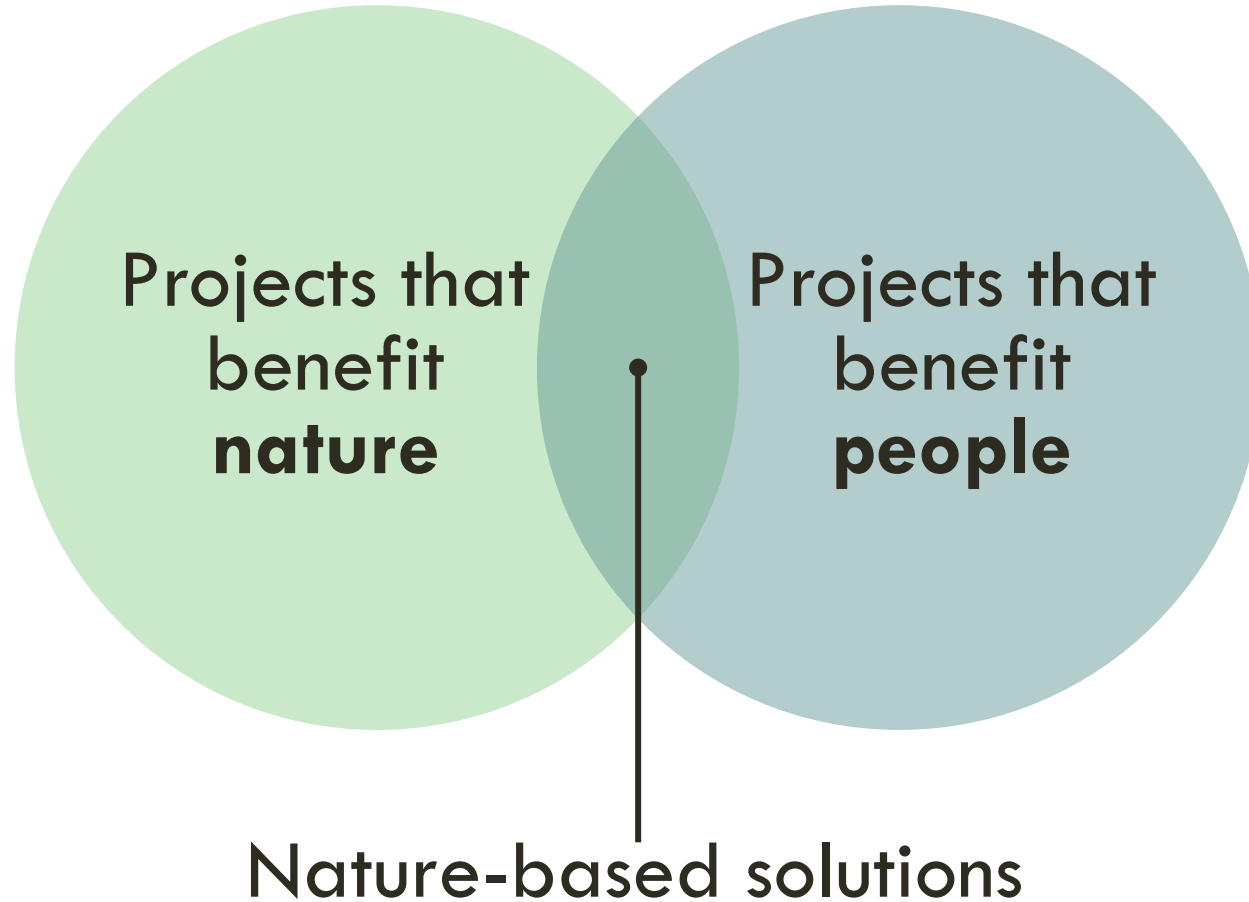


DESIGNING A NATURE-BASED SOLUTIONS PROJECT DATABASE ON RESTORATION BENEFITS TO MEET DECISION-MAKER INFORMATION NEEDS



Katie Warnell & Lydia Olander
NCER, 4/16/2024

ECOLOGICAL RESTORATION & NATURE-BASED SOLUTIONS



INFORMATION NEEDS FOR NBS DESIGN, SELECTION, AND FUNDING

- Uncertainty around NBS performance
- NBS performance data useful for
 - Developing design guidance/standards
 - Project planning
 - Adaptive management
 - Evaluating project success
 - Communicating about project benefits
 - Valuing project benefits

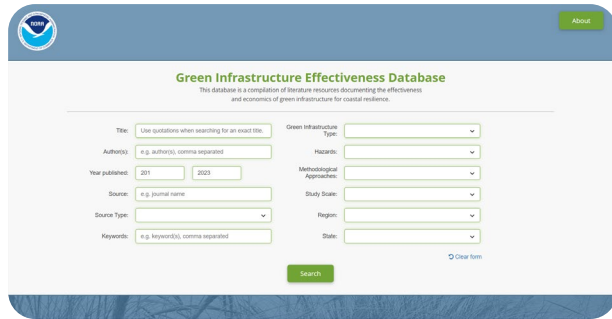
What data is already out there?

ASSESSMENT OF EXISTING NBS DATABASES

Objectives:

- Understand what information is currently available
- Evaluate the type of information
- Assess the coverage of NBS information available - geography and NBS type
- Identify gaps in NBS database coverage and utility

NBS DATABASES INCLUDED

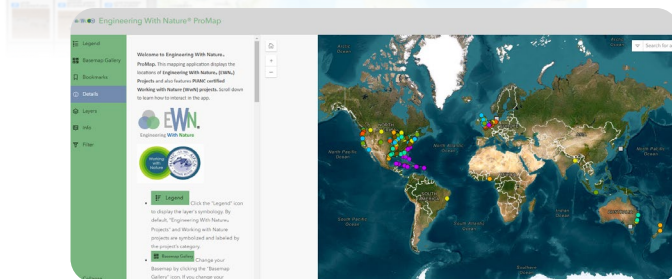
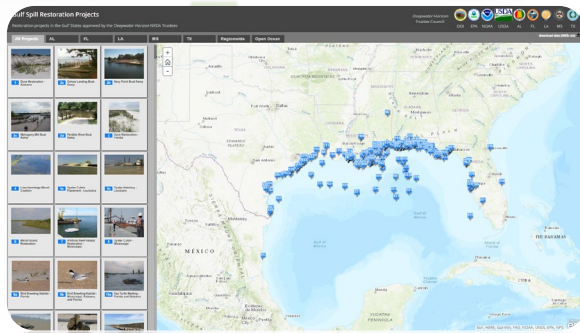


Literature databases (4)

- Green Infrastructure Effectiveness Database (NOAA)
- Nature-based Solutions Evidence Platform (University of Oxford)
- BlueValue (Harte Research Institute)
- River Engineering Resources

Project databases (15)

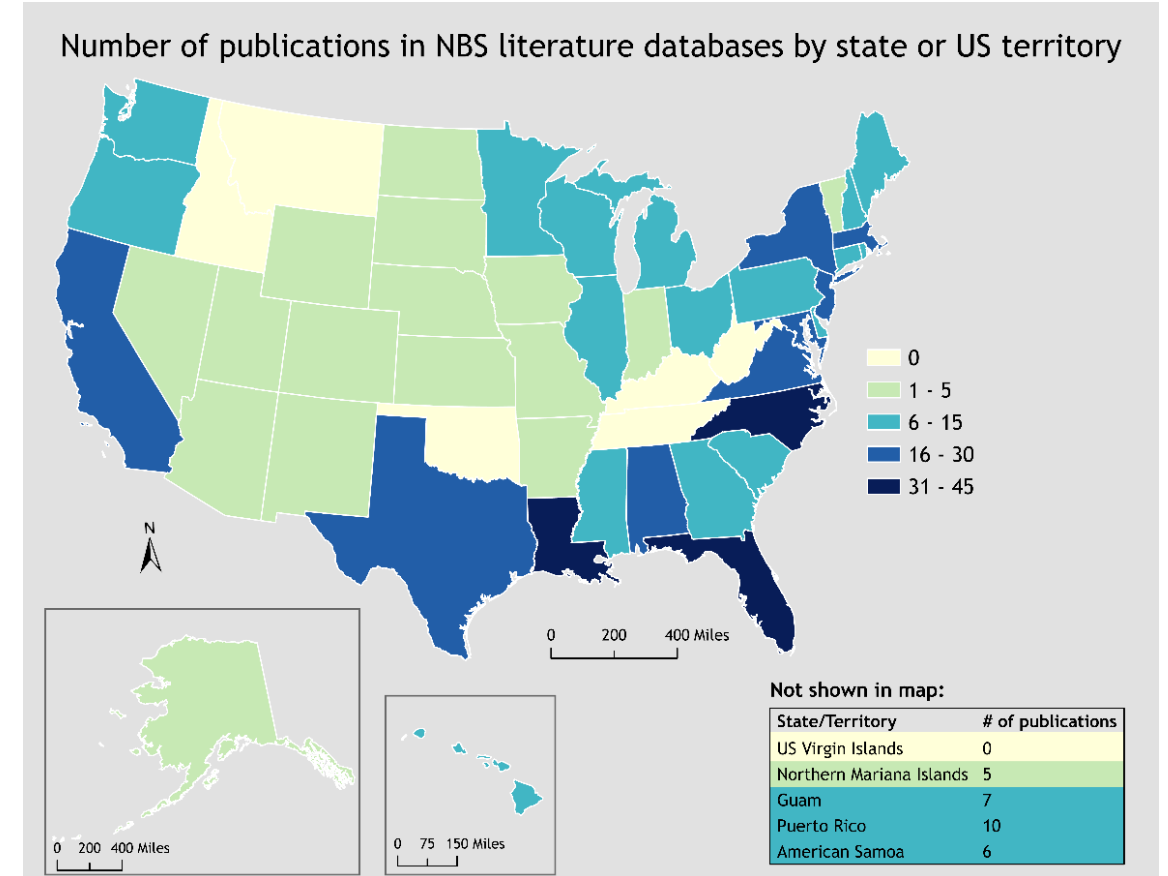
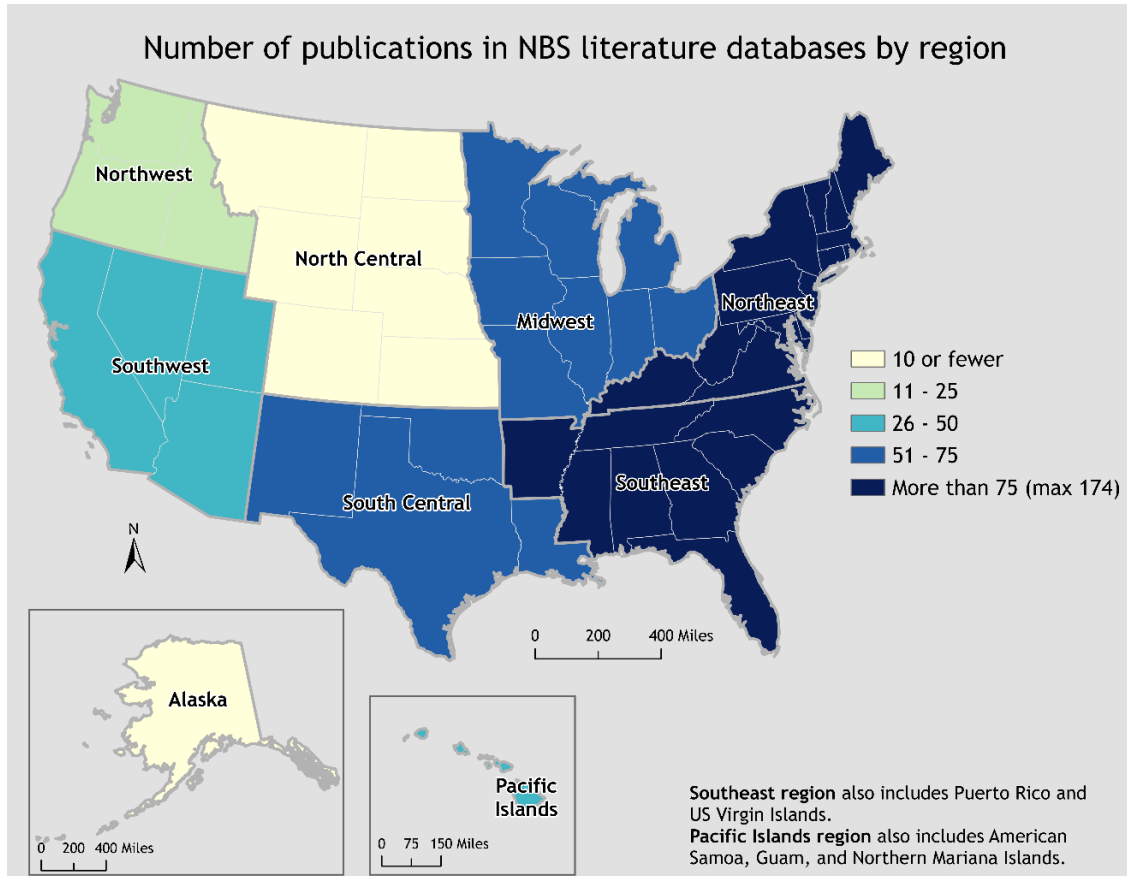
- Restoration Atlas (NOAA)
- Habitat Restoration & Protection Database (Long Island Sound Study)
- Great Lakes Regional Habitat Restoration Database (NOAA-GLC Regional Habitat Restoration Partnership)
- Gulf Spill Restoration Projects (NOAA, Deepwater Horizon Trustee Council)
- US Department of the Interior Bipartisan Infrastructure Law Projects Map (DOI)
- Naturally Resilient Communities Solutions and Case Studies (Naturally Resilient Communities)
- BMP Mapping Tool (International Stormwater BMP Database)
- Engineering with Nature ProMap (Engineering with Nature)
- Nature Based Solutions (Nature Based Solutions)
- Living Shorelines Project Map (NOAA)
- Low Impact Development Atlas (NEMO Program, University of Connecticut)
- Thin Layer Placement Case Studies Map Portal (US Army Corps of Engineers)
- LID Atlas Map (SC Sea Grant)
- Regulatory In-lieu Fee and Bank Information Tracking System (US Army Corps of Engineers)
- Conservation and Adaptation Resources Toolbox Case Study Dashboard (DOI, University of Arizona)



LITERATURE DATABASES: CONTENT & FUNCTIONALITY

- ✓ List publications about effectiveness or benefits of NBS
- ✓ Search & filter functions to identify relevant publications
- ✗ Users generally need to access individual publications for details
- ✗ Varying levels of specificity on location, habitat, and NBS type
- ✗ Not easy to tell when databases were last updated
- ✗ Only 2 of the 4 databases allow users to download results

LITERATURE DATABASES: COVERAGE

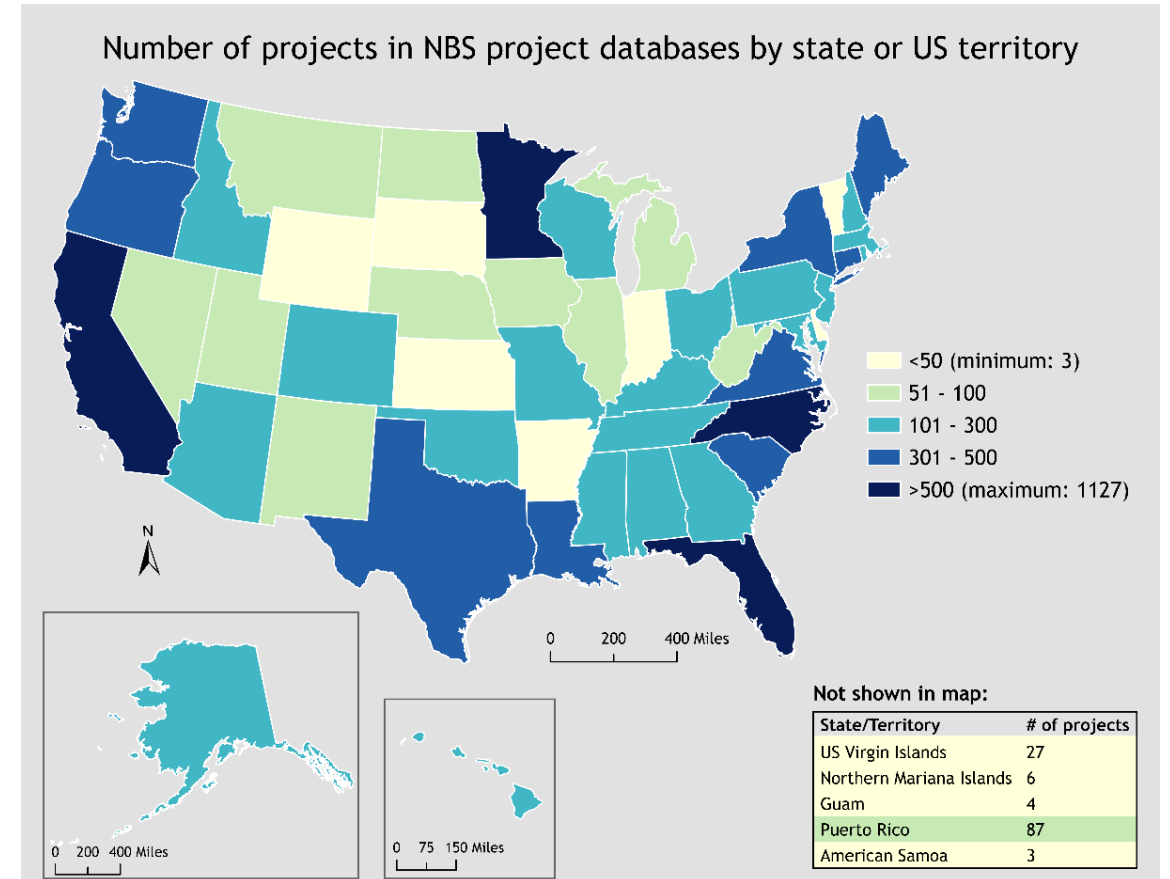
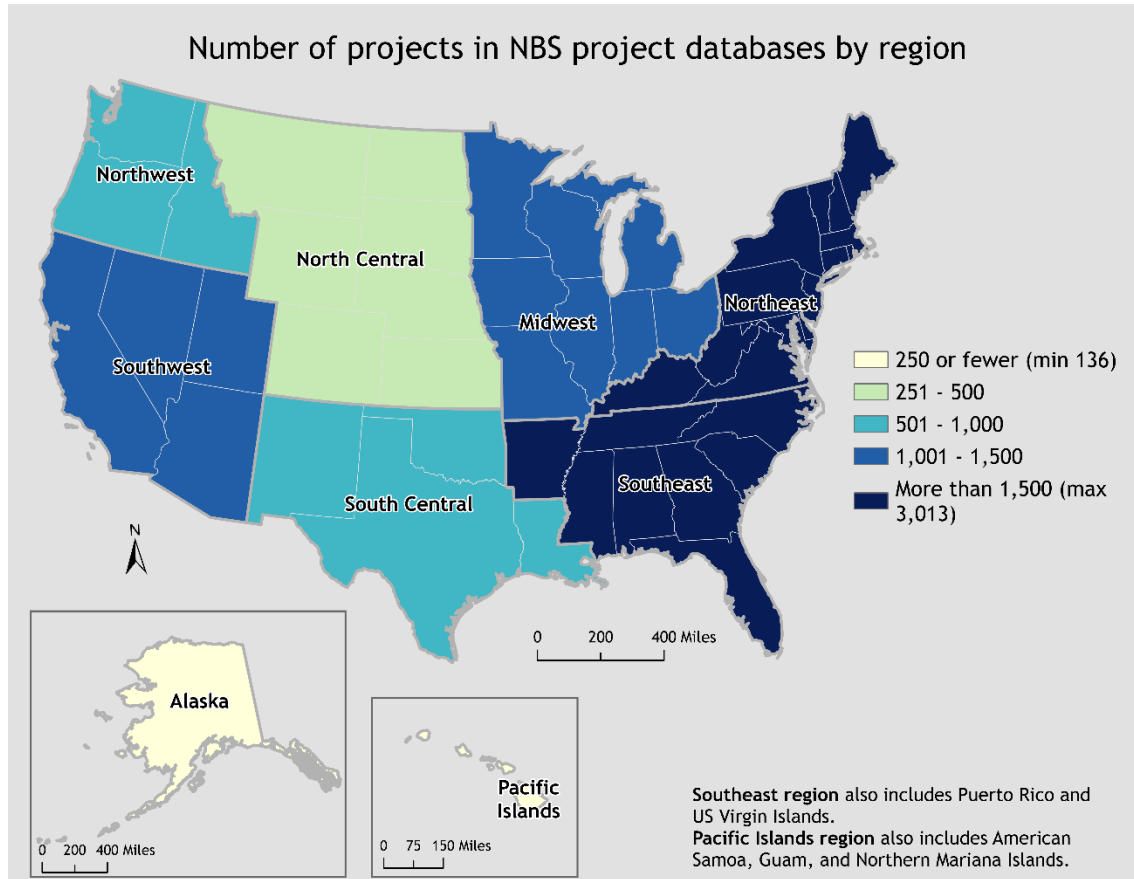


Publication counts are from the *Green Infrastructure Effectiveness Database* and *BlueValue* – other literature databases do not provide location information more specific than the country level.

PROJECT DATABASES: CONTENT & FUNCTIONALITY

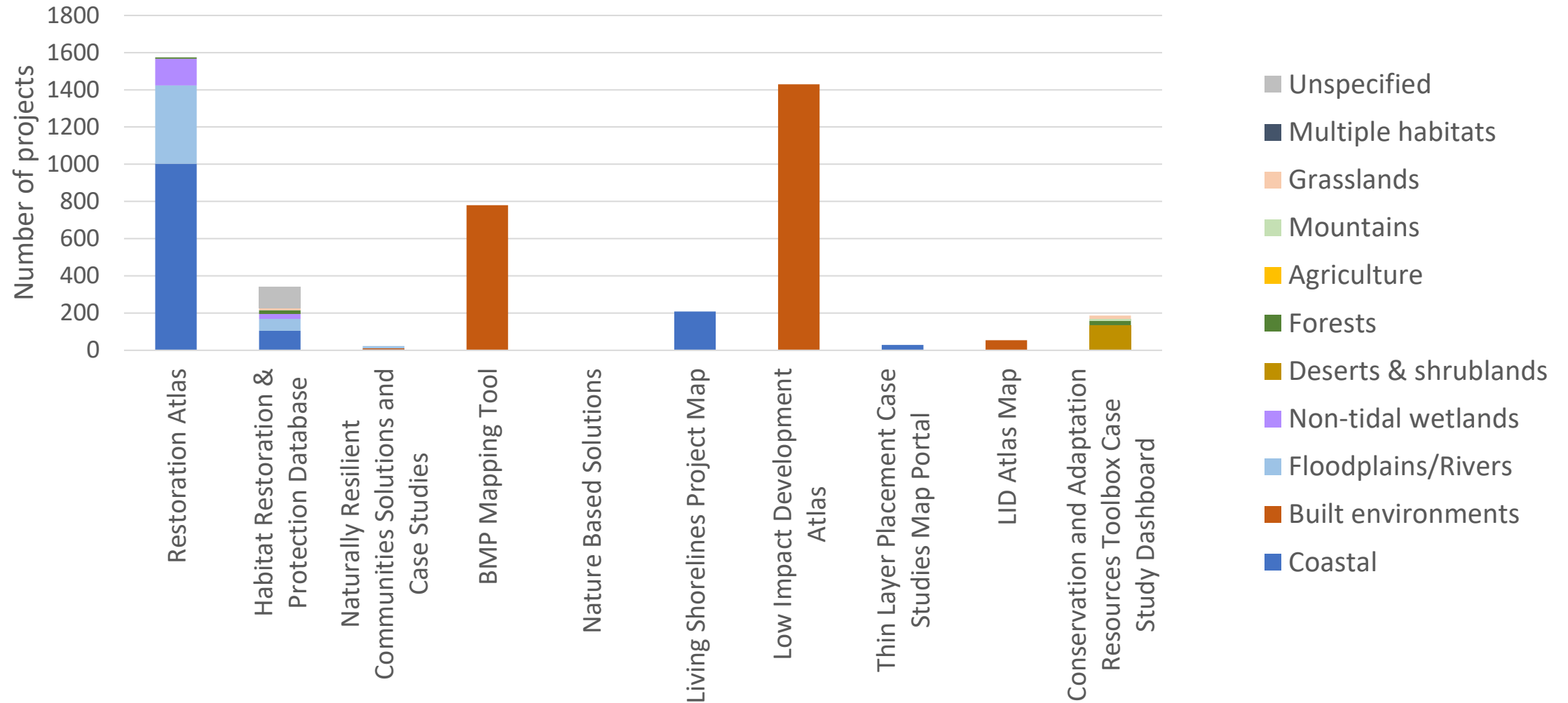
- ✓ Almost all map project locations
- ✓ Filter function to identify relevant projects (by NBS type, habitat, funding program, etc.)
- ✗ Only 3 of the 15 databases include any effectiveness information – usually biophysical parameters (reef height, riparian width, water quality parameters)
- ✗ Varying levels of specificity on NBS type & inconsistent terminology
- ✗ Many are missing geographic attribute information (e.g., state) and can't select projects within an area of interest
- ✗ Lacking information on update frequency or date of last update
- ✗ Only 2 of the 15 databases allow download of project information

PROJECT DATABASES: COVERAGE



Project counts are from 12 of the 15 project databases, which had state-level geographic information. Excluded databases are the BMP Mapping Tool, Engineering with Nature ProMap, and Great Lakes Regional Habitat Restoration Database.

PROJECT DATABASES: COVERAGE



GAPS & RECOMMENDATIONS

GAPS

- Lack of coverage: non-coastal states, Alaska, Pacific Northwest, and Pacific Islands
- No agricultural NBS
- Project databases have <50 projects on NBS in forests, grasslands, and mountains.
- Literature databases have <5 publications on NBS in deserts and shrublands, and <50 publications on NBS in grasslands, mountains, and non-tidal wetlands.

RECOMMENDATIONS

- Make the full database downloadable as a csv file
- Include categorical geographic information (e.g., county, state, country) in addition to project coordinates
- Include key project outcomes as a separate attribute
- Add project type and habitat type attributes using a consistent typology across databases
- Include project performance/effectiveness data

NEW PROJECT



Two key types of information needed on benefits provided by NBS included:

- **Risk reduction** (coastal erosion, flood severity/frequency, fire severity/frequency, mud slide risk, wet bulb globe temperatures)
- **Species/habitat benefits** (avoided impacts, habitat improvements, adaptation capacity)

Nature-based solutions that may be included:

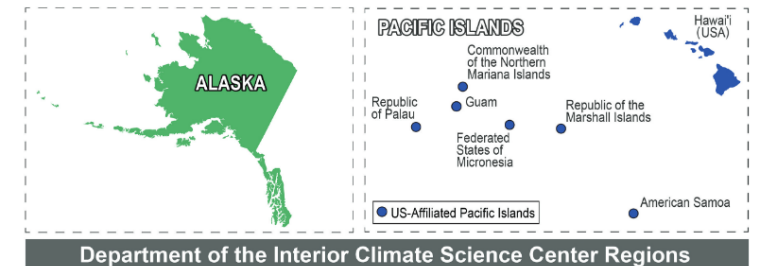
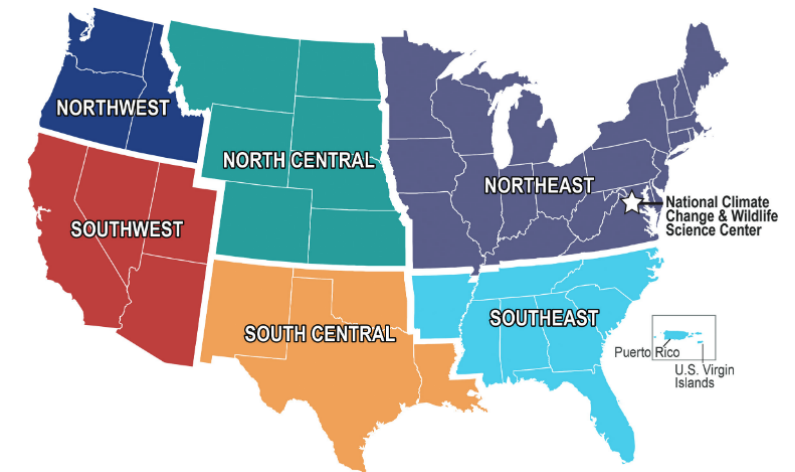
- Coastal wetlands
- Oyster reefs
- Bank stabilization
- Enhanced floodplain water storage



BUILDING AN NBS EFFECTIVENESS AND PERFORMANCE DATA MEASUREMENT NETWORK



- Starting with the Southeast Climate Adaptation Science Center(SECASC) University-USGS collaboration in the SE region and its network of Universities
- In the future, scaling the work to the national CASC as a research network
- Build a shared data collection collaborative with project funders, project developers, and universities (e.g., FWS, NFWF, Land trusts, etc.)





APPLICATIONS FOR THE DATA COLLECTED

1. Project evaluation and reporting
2. Data for project planning as well as design and engineering standards
3. Data for parameterizing models for valuing the risk reduction benefit for clarifying ROI or by providing data for new insurance models



DELIVERABLES FOR PHASE 1



Recommendations on metrics and measurement protocols for risk reductions and species adaptation



A data sharing template and process



A webpage with project information (metrics, protocols, data template, data standards, and resources)



A plan for phase 2 activating the SE research measurement network & testing metrics

WE NEED YOUR INPUT!



Interested in participating in project discussions or just staying in the loop?
Want to suggest someone else we should reach out to?

→ Send an email to katie.warnell@duke.edu



Want to chat this week about your information needs related to NBS projects,
experience monitoring NBS or evaluating project effectiveness?

→ **Visit my team at the Nicholas Institute table in the Poster Hall**

THANK YOU!