Advancing Nature-based Solutions in the Great Lakes

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Nature-based Solutions

The use of existing natural areas or engineered solutions that mimic natural processes to minimize flooding, erosion, and runoff.

Courtesy: Old Woman Creek NERR

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LIVING SHORELINES SUPPORT RESILIENT COMMUNITIES

Living shorelines use plants or other natural elements—sometimes in combination with harder shoreline structures—to stabilize estuarine coasts, bays, and tributaries.

One square mile of salt marsh stores the carbon equivalent of **76,000 gal of gas** annually.

Marshes trap sediments from tidal waters, allowing them to **grow in elevation** as sea level rises.

Living shorelines improve **water quality**, provide fisheries **habitat,** increase **biodiversity,** and promote **recreation**.

Marshes and oyster reefs act as natural **barriers** to waves. **15 ft** of marsh can **absorb 50%** of incoming wave energy.

Living shorelines are **more resilient** against storms than bulkheads.

33% of shorelines in the U.S. will be **hardened** by 2100, decreasing fisheries habitat and biodiversity.
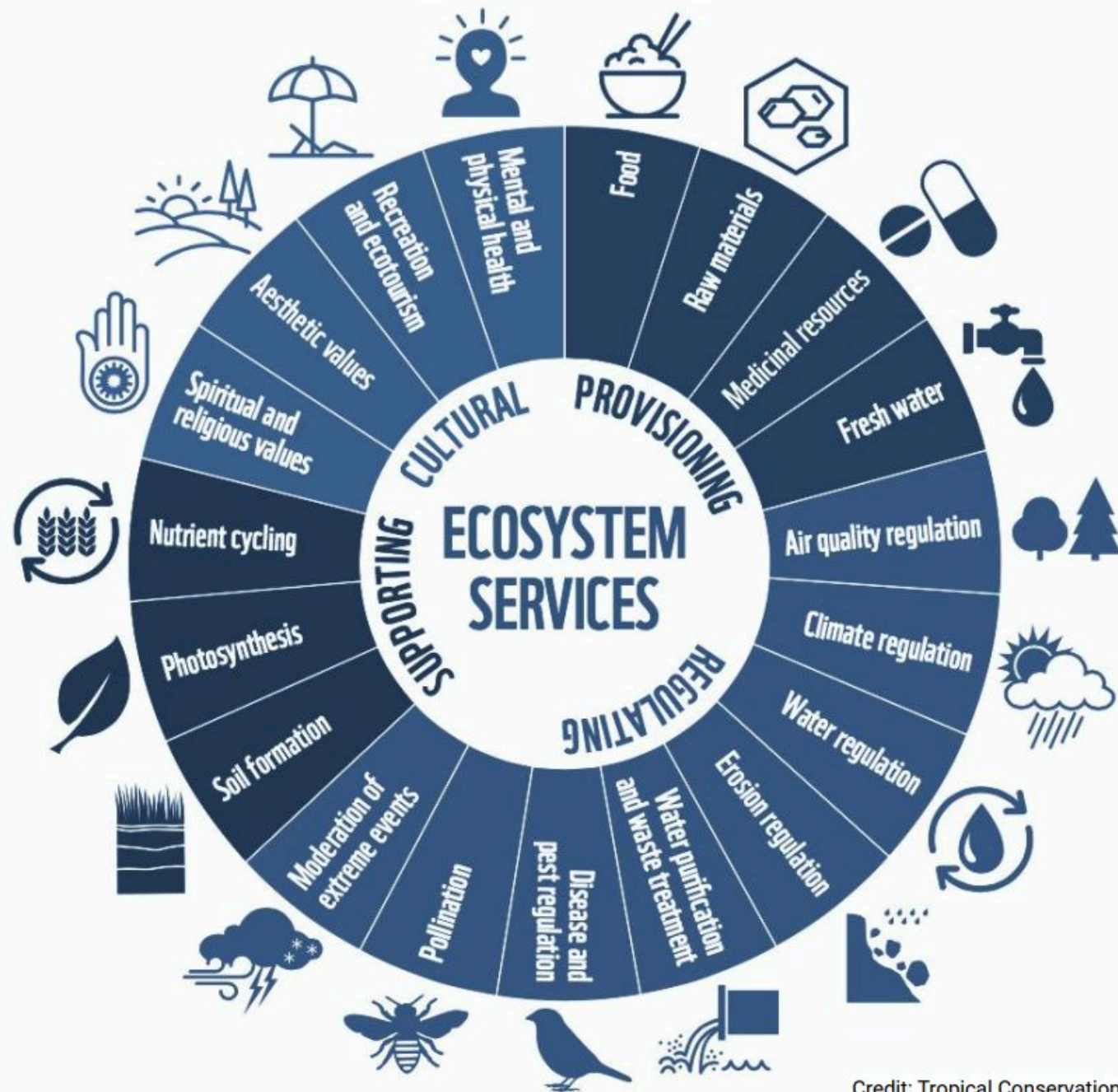
Hard shoreline structures like **bulkheads** prevent natural marsh migration and may create seaward **erosion**.

The National Centers for Coastal Ocean Science | coastalscience.noaa.gov

Some graphics courtesy of the Integration and Application Network, University of Maryland Center for Environmental Science (ian.umces.edu/symbols/)
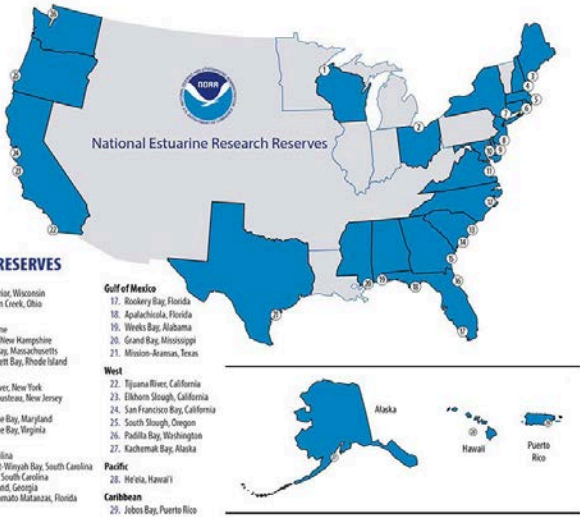
Credit: Tropical Conservation Fund

NOAA Partnerships

National Coastal Resilience Fund

Since 2018 in the Great Lakes, 16 projects have been supported with 20 NCRF grants

CHEERS (in OH). Objectives:
- Connect people and communities to Lake Erie, program spaces that meet the needs of the community
- Protect critical infrastructure and expand natural habitat areas, and
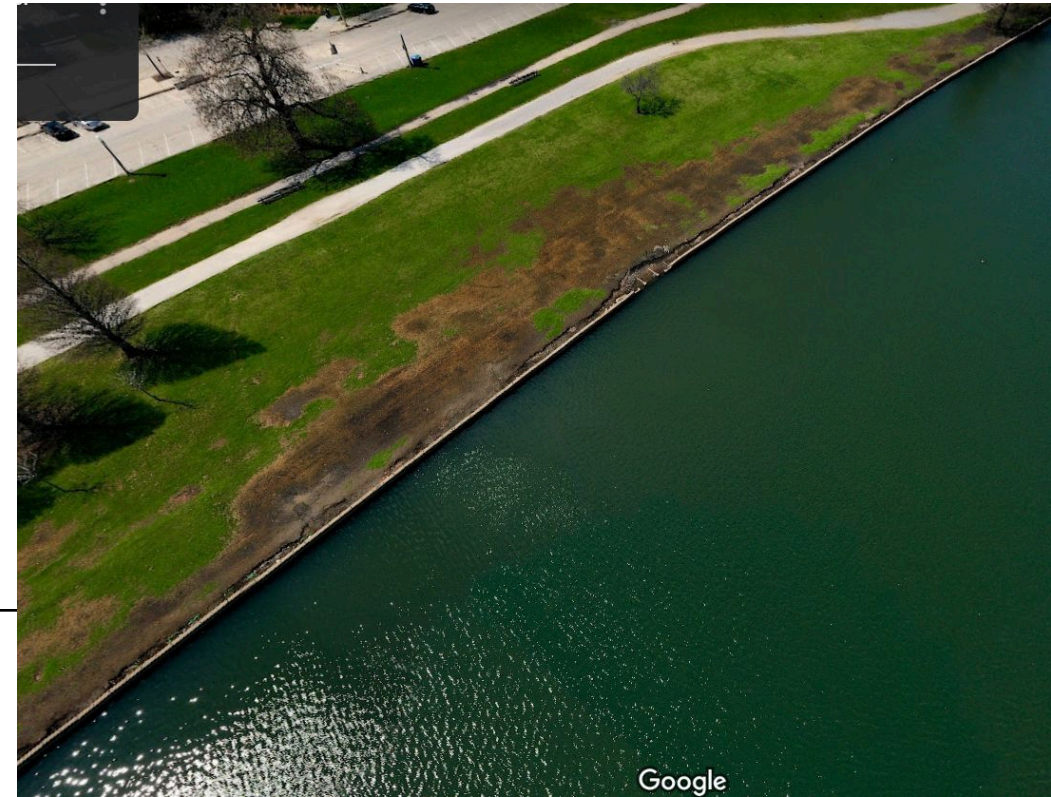- Celebrate the legacy, history, and significance of Lake Erie

www.nfwf.org/programs/national-coastal-resilience-fund

Support for Engineering and Design

State-prioritized projects:

- OCM partnership with the Coastal States Organization, LimnoTech/SmithGroup

- Have supported E&D for 8 projects thus far, more to come

Municipality-prioritized projects:

- OCM partnership with the Great Lakes and St. Lawrence Cities Initiative, Dewberry/LimnoTech

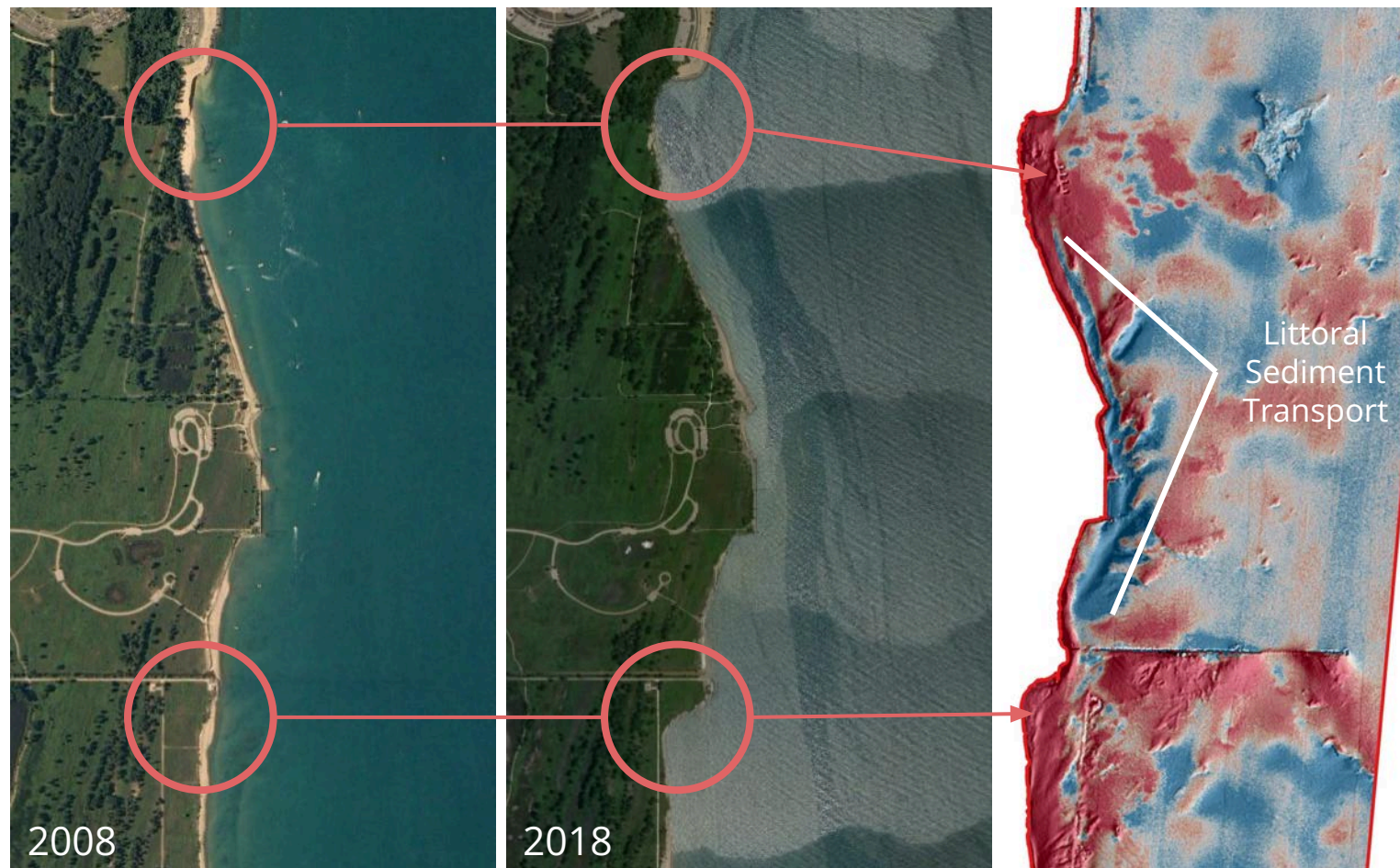- Currently supporting E&D for 2 projects, more to come

Lincoln Park South Lagoon, Chicago, IL

Illinois Beach State Park - Data & Monitoring

Coastal Erosion

Impact to coastal wetlands and habitat

Littoral sediment transport

Red - erosion

Blue - deposition

Littoral Sediment Transport

2008

2018

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Nature-Based Shoreline Guides

Digital Coast: An Enabling Platform

coast.noaa.gov/digitalcoast

Data: 94 terabytes of imagery; over 16 trillion lidar data points

Tools: Over 80 decision-support and visualization tools

Training: Over 170 instructor-led trainings, case studies, publications, quick references, videos, and webinars

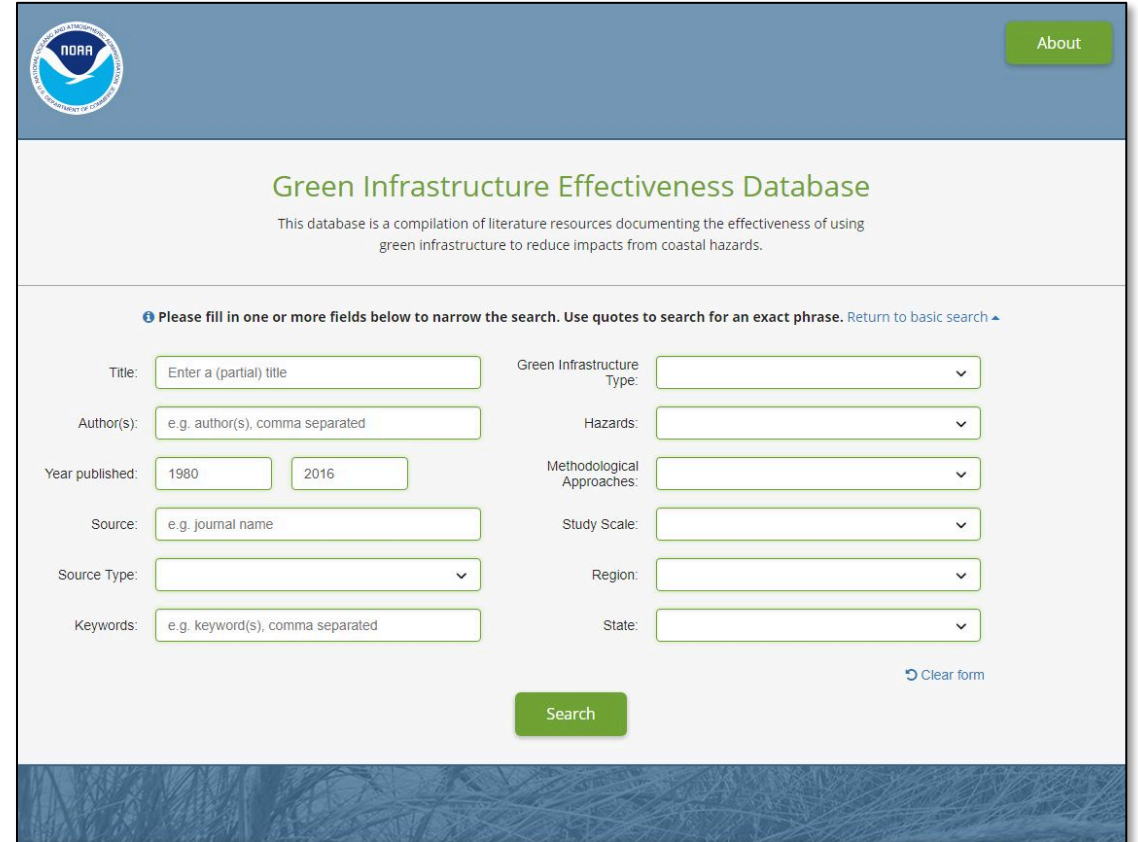**Technical Assistance:** HQ and regional staff

Green Infrastructure Effectiveness Database

The database has **over 300 literature sources**. Users can search by:

- 32 green infrastructure types
- Author
- Year
- Geography (i.e., region, state)
- Scale (e.g., site, watershed)
- Hazard of interest
- … and more

coast.noaa.gov/digitalcoast/training/gi-database.html

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Marshes with and without sills protect estuarine shorelines from erosion better than bulkheads during a Category 1 hurricane

Rachel K. Gittman [a, *], Alyssa M. Popowich [a, 1], John F. Bruno [b], Charles H. Peterson [a, b]

The Effectiveness, Costs and Coastal Protection Benefits of Natural and Nature-Based Defences

Siddharth Narayan ✉, Michael W. Beck, Borja G. Reguero, Iñigo J. Losada, Bregje van Wesenbeeck, Nigel Pontee, James N. Sanchirico, Jane Carter Ingram, Glenn-Marie Lange, Kelly A. Burks-Copes

Economic valuation of suspended sediment and phosphorus filtration services by four different wetland types: A preliminary assessment for southern Ontario, Canada

Tariq Aziz ✉, Philippe Van Cappellen

Muskegon Lake Area of Concern Habitat Restoration Project: Socio-Economic Assessment Revisited

Measuring the economic benefits of Saginaw Bay coastal marsh with revealed and stated preference methods
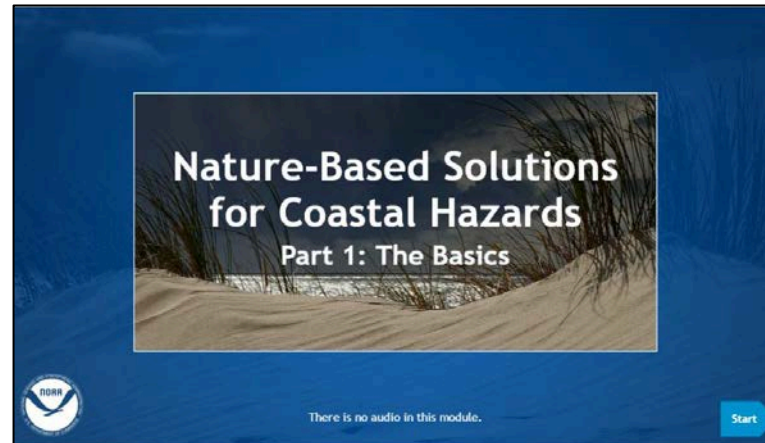
John C. Whitehead [a, *], Peter A. Groothuis [a, 1], Rob Southwick [b, 2], Pat Foster-Turley [b]

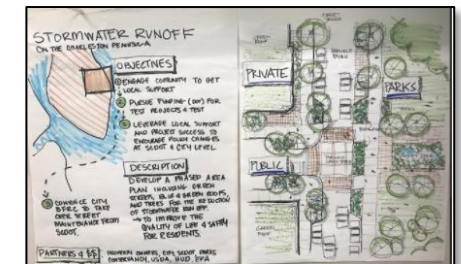# Nature-Based Solutions for Coastal Hazards Training

Course Topics:

- Coastal hazards
- Nature-based infrastructure practices, benefits, co-benefits
- Design, maintenance, costs
- Planning, funding, partners

Part 1: The Basics (Online)

Part 2: Developing a Strategy (In-person*)

coast.noaa.gov/digitalcoast/training/green.html

Lingering needs or concerns

- More information
- Project examples/case studies
- Help with funding
- Data
- Avenues for collaboration/networking
- Concerns about regulatory hurdles

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Thank you!
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