2023 EU-US Knowledge Exchange Webinar: Nature-Based Solutions in the United States

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Eileen Shader, CFM
American Rivers
Association of State Floodplain Managers, Natural and Beneficial Functions Committee
Healthy Rivers Are Essential To All Life
1. Clean Water  
2. Dam Removal  
3. Hydropower  
4. River Protection  
5. Floodplain Restoration
Healthy Rivers and Communities are Threatened by Three Existential Crises

- **Biodiversity Crisis**: Accelerating loss of species across the globe, especially freshwater species.

- **Racial Justice Crisis**: BIPOC communities and Tribal Nations disproportionately harmed by polluted rivers, flooding, and lack of clean water.

- **Climate Crisis**: Increasing floods, droughts and water scarcity necessitate more resilient ecosystems.

Yellowstone River, June 14 2022, AP
Association of State Floodplain Managers

ASFPM is a scientific and educational nonprofit organization dedicated to reducing flood loss in the nation.

- Educate policymakers
- Certified Floodplain Manager certification
- Professional development and training
- Applied research, emerging technology, develop tools

ASFPM Natural and Beneficial Functions Committee:

- Volunteer members of ASFPM
- Champion protection and restoration of natural, functional floodplains
- Support ASFPM policy team
- Educate and inform ASFPM membership
Floodplain Management in the United States
Defining Floodplains In the United States

1. Geomorphological
2. Regulatory
3. Ecological

Functional (natural) floodplain:

landscape features that are formed and influenced by rivers and coasts and upon which biophysical processes and ecosystems operate. (Adapted from Opperman, 2017)

https://www.ucpress.edu/book/9780520294103/floodplains
Attributes of a Functional Floodplain:

1. Connected
2. Variable Flows
3. Habitat and Landscape Features
4. Appropriate Spatial Scale
But many floodplains look like this…
“Floodplains can be altered through urban sprawl, agriculture, logging, energy development, and transportation. Indeed, 42 percent of [Western] rivers are affected by land-based development that alters their natural state.”

-The Disappearing West by Center for American Progress and Conservation Science Partners
U.S. Flood Management: Where we’ve been

Natural Resource Protection

Flood “Control”

Disaster Assistance

“Unified” Floodplain Management, Structural and Non-Structural Approaches
Executive Order 11988, Floodplain Management

E.O. 11988 (1977)

- Federal agencies must avoid taking action in the floodplain
- If no alternative exists, take steps to minimize direct and indirect impacts of the proposed action and restore and preserve the floodplain.
Executive Order 13690, Federal Flood Risk Management Standard

E.O. 11988 (1977)

• Federal agencies must avoid taking action in the floodplain
• If no alternative exists, take steps to minimize direct and indirect impacts of the proposed action and restore and preserve the floodplain.

E.O. 13690 (2015 2021)

• Define floodplain area using large flood (500 yr/2 ft freeboard/Climate-informed)
• “Where possible, an agency shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration.”
• STATUS: Agencies are currently developing guidance
EO 14072 Signed by President Biden on Earth Day, April 22, 2022

(a) The Chair of the Council on Environmental Quality, the Director of the Office of Science and Technology Policy, and the Assistant to the President and National Climate Advisor shall ... **submit a report to the National Climate Task Force to identify key opportunities for greater deployment of nature-based solutions across the Federal Government**, including through potential policy, guidance, and program changes.
Defining Nature Based Solutions

Nature-based solutions are actions to protect, sustainably manage, or restore natural or modified ecosystems to address societal challenges, simultaneously providing benefits for people and the environment.

- **DOD**: Natural infrastructure solutions
- **EPA**: Green infrastructure, low impact development
- **NOAA**: Low impact development, living shorelines, nature and nature based features
- **USACE**: Nature and nature based features (NNBF), Engineering with Nature
- **USDA**: Climate smart commodity
- **FEMA**: Nature-based solutions
## Examples of Freshwater NBS

<table>
<thead>
<tr>
<th>Problems</th>
<th>Examples of Nature-Based Solutions</th>
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<tbody>
<tr>
<td>Greenhouse gas emissions</td>
<td>• Conserving or restoring coastal habitats, forests, wetlands and grasslands</td>
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<td>• Improved agricultural management</td>
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<td>Inland flooding; non-point source pollution; and erosion</td>
<td>• Floodplain reconnection and restoration</td>
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<td>• Enhanced water storage in wetlands, forests or farmland</td>
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<td></td>
<td>• Protecting or restoring riparian buffers</td>
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<tr>
<td></td>
<td>• Sustainably managing forests, farms and grazing lands</td>
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<td>Stormwater and sewer overflow and costs; urban flooding,</td>
<td>• Green Roofs</td>
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<td>• Rain gardens</td>
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<td>• Bioswales</td>
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<td></td>
<td>• Urban trees and forests</td>
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<td>• Constructed wetlands</td>
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<tr>
<td>Shoreline erosion; tidal flooding; storm surge</td>
<td>• Protecting or restoring coastal habitats</td>
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<td>• Living shorelines</td>
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<tr>
<td>Wildfire</td>
<td>• Forest management</td>
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<td>• Greenbelts</td>
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<tr>
<td>Drought</td>
<td>• Clearing invasive plants</td>
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<td>• Protecting beavers</td>
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<td>• Water storage on agricultural fields (meadow or wetland restoration)</td>
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Principles To Guide Design and Implementation of NBS

1. Start with nature-based solutions
2. Benefit people and nature
3. Interweave equity
4. Use evidence
5. Continually improve
Challenges to Nature-Based Solutions

1. Insufficient awareness of nature-based solutions.
2. Regulatory and policy hurdles
3. Difficulty accounting for costs and benefits
4. Insufficient and uncoordinated funding
5. Limited federal, community, and workforce knowledge and skills
6. Gaps in effectiveness

Figure 1. Summary of federal resources available to support use of nature-based solutions for several benefits
First U.S. Nature-Based Solutions Strategy

1. Update Policies
2. Unlock Funding
3. Lead with Federal Facilities and Assets
4. Train the Workforce
5. Prioritize Research, Innovation, Knowledge, and Adaptive Learning
Nature-Based Solutions and the National Flood Insurance Program

- **Mapping**: 1% annual chance floodplain.
  - Does not map floodplain functions.
- **Flood Insurance**: Required for federally backed mortgages in 1% annual chance floodplain.
  - No consideration of natural areas.
- **Floodplain Management**: regulations, zoning, building codes.
  - Flood height, not floodplain function.
- **Mitigation**: Reduce flood risk using relocation, buyouts, elevation, etc.
  - Starting to fund nature-based solutions
Building Resilient Infrastructure and Communities (BRIC) FY21: 17/53 projects ($358,190,000) identified by FEMA as having nature-based components.

Watershed Scale: Interconnected systems of natural areas or open space

Neighborhood/Site Scale: Managing stormwater where it falls

Coastal Scale: Buffer the coast from storm impacts
Nature-Based Solutions at the U.S. Army Corps of Engineers

**USACE Civil Works: The Builders**
- Outdated Guidance, prioritizes building structures
- Benefit-cost analysis favors big structures
- Siloed teams

**USACE Engineering with Nature: The Innovators**
- Integrating teams
- Educating USACE staff
- Thinking creatively and using new tools
Infrastructure Investment and Jobs Act, 2021

- **TOTAL: $1.2 Trillion in infrastructure investments**
  - $20 Billion to farmers to increase carbon storage and reduce emissions
  - $5B for forest management to reduce wildfire
  - $8.7 billion for nature-based solutions in transportation
  - $8.6 B to restore and conserve coastal habitats
  - Historic investments in clean water, including green stormwater
  - $1 B for FEMA resilience projects

https://fundingnaturebasedsolutions.nwf.org/
U.S. Flood Management: Where we’ve been, and Where we are going

Natural Resource Protection

1900

Flood “Control”

EO 11988, Floodplain Management

1904

Unified National Program for Floodplain Management

1980

2012 Hurricane Sandy

2020

2022: First U.S. Nature-Based Solutions Strategy

2030

Integrated Floodplain Management That Uses Nature First

Disaster Assistance

“Unified” Floodplain Management, Non-Structural Approaches
Questions?

Eileen Shader
eshader@americanrivers.org
570-856-1128
Life Depends on Rivers
Links and Resources

- American Rivers, [Reconnecting Rivers to Floodplains](#)
- Serra-Llobet, A., et al. [Managing Residual Flood Risk behind Levees: Comparing USA, France, and Quebec (Canada)](#)
- J. Opperman et al, [Floodplains: Processes and Management for Ecosystem Services](#)
- Conservation Science Partners, [Disappearing Rivers](#)
- American Rivers, [Restoring Western Headwater Streams with Low-Tech Process-Based Methods](#)
- Sierra Meadows Partnership [website](#)
- Central Valley multi-benefit projects [website](#)
- Floodplains By Design [website](#)
- Association of State Floodplain Managers [website](#) and NBF Committee [website](#)