Restoring Rivers for People and Nature

Eileen Fretz
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American Rivers
Rivers Connect Us
Healthy Rivers

- Transport water, sediment, nutrients, organic material
- Support fish & wildlife that depend on *flowing* water
- Maintain water quality
- Are connected from headwaters to salt water AND to their floodplain
Floodplain Ecosystems
Natural and Beneficial Functions of Floodplains
Natural Flood Protection
Traditional Ways of Managing Floods
In the U.S. there are...

84,000 Dams

100,000 miles of levees

But Flood Damages Keep Rising
Work With Rivers, Not Against Them

Sustainable Flood Management

Reducing Risk
- Floodplain Planning & Zoning
- Corridor Protection (open space, wetlands, etc)
- Risk Communication
- Emergency Preparedness (EAPs, warning systems, flood insurance, etc)
- BMPs (minimize impervious cover, groundwater recharge, etc)
- Design for the Future (changes in flow)

Sustainable Flood Control
- Give the River Room
  - open space
  - connected corridors
- Eliminate, Enlarge or Setback Blockages
  - Buildings
  - Bridges
  - Culverts
  - Conduits
  - Dams
  - Levees,
  - Embankments
- Increase Attenuation
  - Functioning Floodplains & Wetlands
  - Complex Channels
  - Roughness
  - Floodplain Benching

On-Site Damage Control
- Raise Buildings
- Floating Infrastructure
- Flood-proof (seal) Buildings
- Re-grade Properties
- Secure Utilities
- Remove Hazardous Materials
- Anchor Floatables

Modified from Wildman and MacBroom
Culvert Upgrades

BAD
Tropical Storm Irene in Vermont

- Over 1,000 culverts failed
- Over 500 bridges damaged
- 13 communities isolated
- 200 miles of state railway impassable and 6 railroad bridges damaged

- 763 Guard troops. Over 170 pieces of equipment from IL, OH, SC, VA, WV, ME, NH, VT
- DOT partners: 150 people, 145 pieces of equipment from ME; NH 75 people, 60 pieces of equipment
- > 200 Private Contractors and Consultants. ~1800 people from the private sector, primarily from Vermont.
Lost largest boulders near outlet and roughness along stem walls. Structure and road undamaged.

Photos: Dan McKinley, USFS
Green Mountain National Forest
FR54/ Sparks Brook Bottomless Arch Inlet and Outlet

Pre-Irene July 2011

Post TS Irene September 2011

Inlet

Outlet

Flood Stage

Photos: Dan McKinley, USFS
Dam Removals
Baraboo River, WI

7 dams removed between 1972 and 2001

Reasons: Liability, poor condition, ecological benefits, flooding of structures and farmland

River length is approximately 65 miles
Baraboo River, WI

- Environmental Benefits of dam removal:
  - Increased Species Richness
  - ~120 miles opened to fish passage
Flood reduction benefits of dam removal:

- Increased Species Richness
- Shift to intolerant riverine species
- Extended migration for several species

Insert shows the change in flooding at an industrial site.

Red area shows 100-yr extent before dam removal. Blue/grey area shows the 100-yr flood extent after dam removal.
Nonstructural Levee Projects
Maquoketa River, Green Island, IA
Maquoketa River, Green Island, IA
Missouri River, L-575, Fremont County, IA
Missouri River Setback Benefits

PUBLIC SAFETY

• Reduce flood stage by 1.5 feet
• Reduce risk to Nuclear power plant

ENVIRONMENTAL

• ~ 2,000 acres of floodplain reconnected
• Fish and Wildlife habitat
Missouri River, L-575, Fremont County, IA

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<thead>
<tr>
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<th>Repair in Place Cost</th>
<th>Levee Setback Cost</th>
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<tbody>
<tr>
<td>Site 1</td>
<td>$14.2 Million</td>
<td>$10.9 Million</td>
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<tr>
<td>Site 2</td>
<td>$4.7 Million</td>
<td>$2.9 Million</td>
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Repairing the Levee in place was more expensive than doing setbacks!
Thank You!

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