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Floodplain Restoration for People and Nature

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American Rivers protects wild rivers, restores damaged rivers, and preserves clean water for people and nature.
Healthy Rivers have:

- **Flow** - Transport water, sediment, nutrients, organic material
- **Clean Water** - Maintain high water quality
- **Habitat** - Support fish & wildlife that depend on *flowing* water
- **Connection** - Are connected from headwaters to salt water AND to their floodplain
## Natural and Beneficial Floodplain Functions

<table>
<thead>
<tr>
<th>Water Resources</th>
<th>Biologic Resources</th>
<th>Societal Resources</th>
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</thead>
<tbody>
<tr>
<td><strong>Flood and Erosion Control</strong></td>
<td>Biological Productivity</td>
<td>Products</td>
</tr>
<tr>
<td>- Provides flood storage and conveyance</td>
<td>- Supports high rate of plant growth</td>
<td>- Enhancement of agricultural lands</td>
</tr>
<tr>
<td>- Reduces flood velocities</td>
<td>- Maintains biodiversity</td>
<td>- Provides sites for aquaculture</td>
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<tr>
<td>- Reduces peak floods</td>
<td>- Maintains integrity of ecosystem</td>
<td>- Restores and enhances forest lands</td>
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<tr>
<td>- Reduces sedimentation</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>Water Quality Maintenance</strong></th>
<th><strong>Fish and Wildlife Habitats</strong></th>
<th><strong>Recreational Opportunities</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Filters nutrients and impurities from runoff</td>
<td>- Provides breeding and feeding grounds</td>
<td>- Provides areas of active and passive use</td>
</tr>
<tr>
<td>- Processes organic wastes</td>
<td>- Provides and enhances waterfowl habitat</td>
<td>- Provides open space</td>
</tr>
<tr>
<td>- Moderates temperature fluctuations</td>
<td>- Habitats for rare, threatened or endangered species</td>
<td>- Provides aesthetic pleasure</td>
</tr>
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<tr>
<th><strong>Groundwater Recharge</strong></th>
<th><strong>Scientific Study/Education</strong></th>
</tr>
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<tbody>
<tr>
<td>- Promotes infiltration and aquifer recharge</td>
<td>- Cultural resources (historical/archaeological)</td>
</tr>
<tr>
<td>- Reduces frequency and duration of low flows</td>
<td>- Opportunities for environmental, biological or other studies</td>
</tr>
</tbody>
</table>

*Unified National Program for Floodplain Management (1994)*
LEVEES EVERYWHERE

There are 881 counties in the U.S. with levees. Those counties contain more than 50 percent of the nation’s population.

Disconnected Floodplain

Connected Floodplain
Climate Change = More Precipitation

More Precipitation = More Floods
Traditional Ways of Managing Floods

30 Year Flood Loss Average = $7.96 Billion/year
The goals of floodplain management:

To reduce the loss of life and property caused by floods and to protect and restore the natural resources and functions of floodplains.

*Executive Order 11988, Floodplain Management, 1977*

*A Unified National Program for Floodplain Management, 1994*

“The Federal Flood Risk Management Standard, a flexible framework to increase resilience against flooding and to help preserve the natural values of floodplains…”

“Where possible, an agency shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration…”

*Executive Order 13690, Federal Flood Risk Management Standard, 2015*
Central Valley of California

Add map/pics of CA flooding
Floodplain Habitat

Benefit depends on the frequency, timing, and duration of inundation.

Increasing area of frequently inundated flood plain habitat is necessary for recovery of salmon populations.
Central Valley Flood Protection Plan Goals

• **Improve Flood Risk Management** – Reduce the chance of flooding, and damages once flooding occurs . . .

• **Improve Operations and Maintenance** – Reduce systemwide maintenance and repair requirements . . . in ways that are compatible with natural processes, and adjust, coordinate, and streamline regulatory and institutional standards . . .

• **Promote Ecosystem Functions** – Integrate the *recovery and restoration* of key physical processes, self-sustaining ecological functions, native habitats, and species into flood management system improvements.

• **Improve Institutional Support** – Develop stable institutional structures, coordination protocols, and financial frameworks that enable effective and adaptive integrated flood management . . .

• **Promote Multi-Benefit Projects** – Describe flood management projects and actions that also contribute to broader integrated water management objectives . . .

Photo courtesy of Cal Trout
Yolo Bypass Expansion

- Lower 200 year flood stage by 4 feet and increase the safe conveyance capacity by ten to twenty percent.
- Remove fish passage barriers and hazards for salmon and sturgeon.
- Significantly increase the area of frequently activated floodplain.
- Continue profitable agriculture in the bypass.

Source: SAFCA and MBK 2007.
Representative Multi-Benefit Flood Management Projects

A. Deer Creek
B. Hamilton City
C. Oroville Wildlife Area
D. Abbot Lake
E. Laurel Avenue
F. Upper Yolo Bypass
G. Sacramento Weir
H. Wood Lake
I. Southport Levee Setback

J. Mormon Slough
K. Paradise Cut
L. Three Amigos
M. Dos Rios/Hidden Valley
N. Sunrise Ranch
O. Three Rivers
P. Cinnamon Slough
Q. Reach 4B
R. Reach 2B
Policy Recommendations

Federal Agency support for multiple-benefit projects, and willingness to explore innovative ideas, especially at district level.
Why Restore Meadows?

Meadow hydrology, soils, & vegetation are interdependent

Sinuous Stream Channel

Diverse Mosaic of Habitats

Inundation during floods, allows sediment deposition; attenuated flood flows

Wet Meadow & Riparian vegetation

Surface flow from snow melt

Subsurface flow from snow melt

Healthy Meadow

High water table supports wet meadow vegetation

Groundwater

Percolation & Groundwater recharge

Bedrock
Why Restore Meadows?

- Disconnection of channel from meadow floodplain
- Soil compaction
- Reduced diversity & productivity
- Incised Stream Channel, increased sediment transport & degraded habitat
- Reduced percolation
- Flood flows confined to channel: No inundation during flood flows
- Surface flow from snow melt
- Xeric vegetation type
- Reduced natural storage of water
- Lowering of groundwater table
- Compacted soils
Federal Agency support to explore incised channel restoration in similar environments in other regions of the country.
Policy Recommendations

- Include Channel Migration Zones on Flood Insurance Rate Maps

- Strengthen minimum floodplain management requirements to deter construction in Channel Migration Zones
Levee Setbacks
Maquoketa River, Iowa
PL 84-99 Policy changes

• “...the Chief of Engineers may include modifications to the structure or project” - WRRDA 2014

• “The President will direct federal agencies to identify and remove barriers to making climate-resilient investments; identify and remove counterproductive policies that increase vulnerabilities; and encourage and support smarter, more resilient investments, including through agency grants, technical assistance, and other programs...” - The President’s Climate Action Plan
PL 84-99 Policy Changes: Rulemaking

54 Water Protection Network members recommended reforms to the P.L. 84-99 Program:
- SWIF should encourage multiple-benefit projects
- Coordinate with natural resource programs
- Plan projects before disaster strikes
- Prioritize repetitive loss locations
- Eliminate bias against “non-structural”
- Revise cost-benefit
Questions?

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