

Raise the Channel or Lower the Floodplain? Methods for Floodplain Reconnection

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Today's Agenda

- Floodplain Reconnection Values
- Raising the Channel Invert
- Excavating the Floodplain
- The Middle Ground
- Conflicting Goals
- Finding Consensus
- Case Studies
- Questions/Discussion



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The Negative Feedback Loop

Value of Floodplain Reconnection

- Reduced forces on stream channel = less erosion
- Increase flood travel times storage
- Improve floodplain wetlands
- Increased baseflow and local water table
- Provide root protection of stream banks
- Improve vegetation (and other) species diversity
- Increased sediment deposition and processing in the floodplain area
- Improved riparian and instream habitat





Highly Integrated Land and Water

Floodplain Sediment and Carbon Sink



Increased Aquatic, Wetland and Terrestrial Habitat Diversity





Restored Wetland Hydrology in
our Floodplains

1st STEP – FIND THE BEST DESIGN OPTION

- **Floodplain reconnection by raising the channel**
 - Pros
 - Significant floodplain reconnection and function
 - Significant Reduction in channel erosive forces
 - Significant floodplain ecological uplift
 - Typically in-channel work only – minor vegetation impact
 - Lower cost than floodplain excavation
 - Cons
 - Significant floodplain elevation/extent increases
 - Temporary disruption of existing channel substrate and biota
 - Deal Killers
 - No raise in flood elevation allowed
 - Homes or infrastructure in adjacent floodplains
 - Bridge/culvert crossings throughout the restoration reach



1st STEP – FIND THE BEST DESIGN OPTION

• Floodplain Excavation

- Pros
 - Moderate floodplain reconnection and function
 - Significant reduction in channel erosive forces
 - Significant floodplain and channel ecological uplift
 - Flood elevation no increase or reduction
- Cons
 - Significant excavation and veg impacts
 - Longer timeframe for mature floodplain vegetation post-restoration
 - Typically Increased cost for excavation, tree removal, riparian vegetation restoration
 - Impacts to existing wetlands or T&E species habitat
- Deal Killers
 - No removal of adjacent riparian vegetation (trees) allowed
 - Utilities in floodplain that would be impacted by excavation
 - Burdensome mitigation requirements for wetland or T&E species habitat



1st STEP – FIND THE BEST DESIGN OPTION

- **Middle Ground - Some Raising/Some Excavation**

- Pros
 - Minor or no flood elevation/extent increases
 - Lesser vegetation impacts compared floodplain excavation only
- Cons
 - Lesser floodplain reconnection compared to other 2 alternatives
 - Lesser impact on channel erosive forces
 - May require some armoring protection to protect bank toe



Conflicting Goals

- Existing Stream Conditions

- Typically Degraded – down-cut channel, over-widened, disconnected from historic floodplain
- Degraded channels are very efficient at carrying flood flows and causing erosion
- All floodplain comparisons are degraded existing conditions versus restored proposed
- Challenging to restore a degraded channel without floodplain impacts
- Existing riparian vegetation is important but may not be feasible to restore impaired channel morphology and floodplain reconnection without some impact



Conflicting Goals

- Regulatory hurdles
 - Silo approach to regulatory reviews
 - Floodplain regulations – for example, regs may require no rise but stakeholders want floodplain reconnection by raising channel to minimize vegetation impacts
 - Easement or Forest Conservation Regulations that were written for Land Development are enforced on restoration projects, limiting the ability to implement floodplain excavation
- Property/Easement Acquisitions
 - Project owner may request that all grading or floodplains are limited to property under their control
 - Floodplains don't follow property boundaries



Finding Consensus

- Avoid Tunnel Vision or Silos
 - Allow for floodplain increases where it makes sense – e.g. floodplains in open space/conservation land and there is not significant impact to structures or private lots
 - Incorporate the CLOMR/LOMR process into projects from the planning phase – allocate the time and dollars
 - Develop realistic project schedules and budgets that don't force a certain restoration approach
 - Incorporate waivers or exemptions to local regulations (e.g. easements or forest conservation) for restoration projects that seek to improve the floodplain and/or forest and avoid burdensome requirements to property owners or project stakeholders
 - Inform the public of the project and gain support if easements and/or acquisitions are needed



Case Study - UMBC

- Existing channel severely incised and disconnected from adjacent floodplain
- Floodplain reconnection by raising the existing channel invert was selected as the restoration approach
- Channel raise accomplished using riffle grade control structures and excavated material from existing vertical streambanks
- Increases in flood elevations were allowed as no regulatory floodplain was present and existing riparian vegetation was poor condition
- Post restoration benefits
 - Erosion reduction
 - Hydration of floodplain and wetland
 - Improved riparian vegetation condition



Case Study - UMBC



Case Study – River Valley Ranch

- Existing channel severely incised and disconnected from adjacent floodplain
- Floodplain reconnection by excavating floodplain benches
- No increases in flood elevations were allowed as FEMA regulatory floodplain was present and structures were located within floodplain
- Floodplain excavation completed on mostly agricultural meadow areas
- Post restoration benefits
 - Erosion reduction
 - Hydration of floodplain and wetland
 - Minimal disruption to existing channel materials and biota



Case Study – River Valley Ranch



Questions?

