Wetland Restoration In Altered Landscapes
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Assessing the Landscape
• Watershed and Project Level
Developing the Restoration Plan
• Objectives and Priorities
• Topographic Survey and Design
Restoration Practices
• Earthwork
• WCS/Pipe
• Vegetation Establishment
Missouri WRP/WRE
(December 2018)

• Total Easements: 1,111
• Total Acres: 154,577.5

WET 1—Chillicothe

• Total Easements: 418 (37.6%)
• Total Acres: 50,484.1 (32.7%)
The significance of the last slide is that since 1992, we have had a tremendous opportunity to gain experience with different restoration methods in a wide variety of floodplain situations.
Assessing The Landscape
Assessing The Landscape at the Watershed Level

Historical Conditions

- Old Soil Surveys
- General Land Office Records
- Ecological Site Descriptions
- Landowner Accounts
- Historic Maps
Assessing The Landscape at the Watershed Level--Existing Conditions

- What’s out there?
- What’s missing?

Has the Landscape Been Altered?
- Channelization
- Levees
- Drainage Ditches
- Land Leveling
- Railroads
- Highways
- Other Infrastructure/Uses
Conditions At the Project/Site Level
• Hydrology
• Soils
• Alterations: Drainage, Levees etc.
• Surrounding Land Uses
• Landowner Objectives
Developing The Restoration Plan
Developing the Restoration Plan—Objectives & Priorities

• Restore site to historic conditions as much as possible
• Reintroduce landscape features/macro-topography to the site
• Do not “overpower” the existing topography—avoid “flood stage” wetlands
• Expand the floodplain where ever possible—levee takedowns
• Identify priority species and/or watershed priorities
• Don’t try to force a piece of land to do something it can’t
Topographic Survey & Conceptual Design

Topographic Survey
- Typically done with survey grade GPS (Trimble)
- 50’x50’ grid
- Pay attention to detail—ditches, etc
- A survey is only as good as the surveyor
- Is your canvas

Conceptual Design
- ...is the Biologist/planner’s vision of the best restoration options for a site
- Will serve as the road map the engineer/designer will use to complete the final design
- Includes berm type, placement of berms, berm elevation, water line/pool area, WCS locations, vegetation establishment, etc.
Determining the Waterline
• May be the most important decision
• What species are you targeting?
• Do not “over power” the topography—avoid “flood stage” wetlands
• Don’t be afraid to split hairs
• Recognize the importance of temporally flooded, saturated and terrestrial areas
Berm Placement

• If possible, locate on the contour
• Mimic landscape features if possible
• Take advantage of existing topography
• If flood prone, align parallel to the flow as much as possible
• Avoid obvious problem areas (scours, excessive deposition, debris)
• Locate spillways/floodways on or close to natural ground if possible
Final Design
• The end product, complete with cross sections, quantities, seeding specs, construction standards and specifications
• It will be important that the biologist/planner and engineer/designer continue to work together during the development of engineering plans
Restoration Practices

- Earthwork (spoils/berms)
- Creative Borrow
- WCS/pipe
- Floodplain expansion
- Existing Infrastructure
- Vegetation establishment
• Emulate natural stream levees or other high ground features
• Very flood friendly—virtually damage free
• Become living, breathing landscape features w/native vegetation
• Provide habitat as well as impoundment structures
...spoils are more than just a habitat mound
• Serve as wave barriers for critical infrastructure
• Used as interior plugs to create “sub-impoundments
• Playground for burrowing animals
• Traditional style earthwork
• Should have minimum 15’ top and 8:1 side slopes
• May be prone to damage
• Function is basically limited to impoundment structure—very little benefit as habitat—typically seeded to non-native grasses
• Despite the negative image, they still have their place
If you must….

- Consider constructing a bench
- Consider grading and shaping the ex levee to something better

Creative Borrow

- This is where we get our depth
- Shapes should mimic the watershed
- Needs and soils will determine depth of cut
- Incorporate islands, basking logs etc.
More Things to Consider on Creative Borrow

- On site verification of soils
- Balance your cuts and fills
- Encourage the contractor to haul and not push
- Remember, the borrow is a design feature, not just a hole or source of dirt
WCS
- Inline
- Manhole
- “Ender”
- Slide gate
Floodplain Expansion & Levee Takedowns

Why? Because in riverine systems, floodwaters are often times the life blood of floodplain wetlands

A couple things to think about...

• Locate in backwater flooding situations—avoid headwater flooding
• Size according to the stream—they cannot be too wide. Tailwater will cause the most damage
• If possible, locate on natural ground to avoid over fall
• Undesirable flood born seed
• Debris—woody, appliances, other trash
Existing Infrastructure

- Be cautious of using existing levees
- Often times in bad shape-trees, slides other sore spots
- Subject to wave wash and subsequent animal damage
- Construction methods may have been somewhat dubious
- Meant to keep short term water out, not long term water in
- Existing Easements?
If you must use...

- Consider constructing a bench
- Consider grading and shaping
Vegetation Establishment

- Wet Prairie—Mulch
- Wet Prairie—Plugs
- Tree Planting
- Natural Regeneration
The Mighty Mallard

- Water Quality
- Biological Diversity
- Flood Storage
- Timber Production
- Recreation
- Esthetic Quality
- Other Functions
Oh, man ... don’t hit me with them negative waves.

NEGATIVE WAVES

Don’t hit me with them.
The End