



Presentation Agenda

- Project Overview
- History and Need
- Design Features
- Permitting Requirements
- Modeling
 - Floodplain
 - Wetland



Project Overview

- Includes removing spillway of low head dam
 - Churchill Woods Forest Preserve
 - East Branch DuPage River
 - Dam originally constructed around 1930
 - Reconstructed 1983 1984
 - Low head dam: 2.7 feet high, 50-ft wide weir crest





Project Overview

- Ecological restoration of impoundment area
 Re-establish flowing channel, plant wetlands
- DuPage Salt Creek Workgroup Project
- Funded by Section 319 Grant and DuPage Co
- Currently under construction





Project History and Need

- East Branch DuPage River is listed as Impaired on IEPA 303(d) list.
- DO is one cause of impairment
- 2004 IEPA TMDL report: Improve DO.
- DuPage Salt Creek Workgroup formed to find ways to improve DO levels in East Branch
 - Performed modeling, continuous DO monitoring
 - Identified lowest DO readings above the Churchill Woods Dam
 - Determined that dam modification is a feasible alternative to improve DO and overall water quality



- Figured out base flow and low flow
 - WWTP discharges and stream gauges
 - Establish average water level for planting season
 - Low flow channel design
- Considered many design configurations



- \$750,000 Grant insufficient for whole project
- Phased Construction
 - Lowered (not removed) Dam
 - Riffles to hydraulically separate u/s from d/s
 - Full restoration u/s, streambank stabilization d/s





- Full funding obtained, plans revised
 - Remove spillway
 - Two rock riffles
 - 30-ft flowing channel
- Wetland restoration
- 33.5 acres wetland plant communities created



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- No floodplain or floodway fill
 - Top/riffles below existing impoundment NWL
- No change in BFE
 - Low head dam doesn't affect 100-yr BFE
- No permanent direct impacts to wetlands
 - Temporary impact for construction access, dam removal
 - Direct impacts to 0.22 acres of Waters at riffles
- Possible Indirect Impacts to Wetlands
 - Possible hydrologic change due to lowering NWL



Permitting Requirements

- USACOE (Wetland permit)
- IDNR OWR (Dam modification permit)
- DuPage County (Stormwater permit)
 - Required modeling to demonstrate conformance to:
 - Floodplain Regulations
 - Floodway Regulations
 - Wetland Regulations

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Floodplain Modeling

- HEC-RAS for Floodplain, Floodway
 - Low head dam not included in FIS model
- FEQ for WSEL and velocity evaluations
 - Unsteady hydraulic model used by DuPage County
 - Uses hydrology from HSPF
 - Models 115 historic storms over a 45-year period of record
 - Must demonstrate: no increase in WSEL, velocity, flow during any of the 115 storms.





Floodplain Modeling Results

- Velocity Increases
 - Expected and desired
 - Demonstrated higher velocities are non-erosive
 - Showed that velocity increases are confined to smaller storms



Hydrologic Modeling for Wetlands

- Regulatory concern that lowering dam and NWL would indirectly impact wetlands
- Used FEQ to evaluate wetland hydrology and possible indirect impacts





Table J	- Select				L 1/4-44
	LPIII Results		FEQ Storms of Similar Magnitude (Modified-Existing)		
	Flow (cfs)	WSEL	Storm Date	Flow (cfs)	WSEL (ft)
1-yr	136.96	687.27	12/17/1991	140	687.31
			3/26/1962	146.4	687.36
			3/30/1959	147.5	687.32
2-yr	413.72	688.27	1/2/1983	426.5	688.26
			5/19/1990	370.3	688.31
			8/26/1980	433.1	688.31
5-yr	594.50	689.02	8/10/1989	631.3	688.98
			10/2/1961	577.2	688.98
10-yr	712.84	689.51	12/12/1982	775.7	689.65
			10/18/1954	742.4	689.72

Table 3 - Selection of Storms for Wetland WL 1A-V







- Wetland WL 1A-W: 6.83 acre emergent marsh
- Depressional Area behind top/bank
- Hydrology from River and from upland areas





 Used modeling to compare Mod-Ex vs Prop: – WSEL, Volume, Inundation Times

Conclusion: Sufficient hydrology to maintain wetland limits and quality of plant community

Wetland WL 1A-W Inundation Analysis 1990 Storm (approx 2-yr equivalent)





- Wetlands WL 1E & 1D: 8 wetlands, 3.1 acres
- Low quality, forested fringe on shoreline
- Hydrology from river and upland areas





Evaluated upslope & downslope edges

 Upslope: 1-yr doesn't reach in mod-ex or prop
 Downslope: NWL reduced 2.5 ft in prop condition

Wetland WL 1E Inundation Analysis 1962 Storm (approx 1-yr equivalent)





- Upland runoff maintained
- River inundation and/or soil saturation from river maintained
- Hydrologic changes to wetland not anticipated
- Regulators: Hydrologic uncertainties, therefore possible indirect impacts.
- Permit requirements:
 - Delineate existing wetland
 - Perform M&M to mitigation standards for 3 yrs
 - Re-delineate wetland in year 3 and compare
 - If no impact, terminate M&M
 - If impacted, continue M&M through year 5



Wetland Design

- Used FEQ hydrographs from small storm events and baseflow event
- Evaluated inundation times and water depths in restoration areas
- Assisted in plant selection and design





Currently Under Construction

November 2010: Impoundment De-watered



Currently Under Construction March 3-4, 2011: Utility Pole **Dam Removed** (Before & After) Wingwall Utility Pole Wingwall







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Project Purpose

- Remove Churchill Dam and:
 - Improve DO levels
 - Restore native wetland plant communities and their related ecological functions
 - Eliminate upstream impoundment
 - Higher water temperatures
 - Excessive algal biomass
 - Improve sediment transport within river segment
 - Eliminate barriers to fish and mussel dispersion