Mud Creek Enhancement

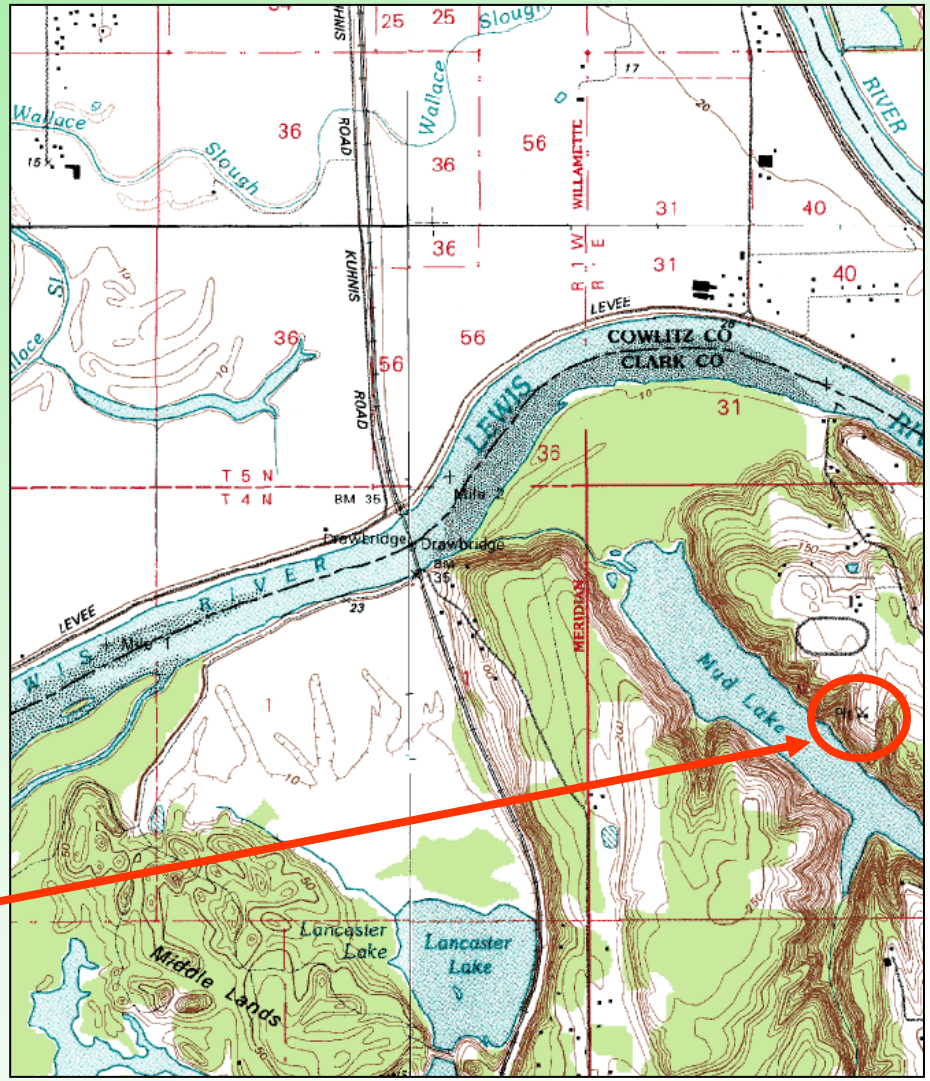
PacifiCorp -- ACC 2008

Cowlitz Indian Tribe

Background:

- Lowest tributary in the mainstem Lewis River
- Confluence on Lewis left bank, ~RM 2.0
- Distributary of Mud Lake
- ~0.5 miles in length
- Very low gradient

Circle C rock quarry




Plas Newydd LLC
Circle C rock quarry
Image © 2007 Metro, Portland Oregon
© 2007 Europa Technologies
Image © 2007 DigitalGlobe
Pointer 45°51'56.17" N 122°44'30.49" W elev 14 ft Streaming 100%
Eye alt 6000
Google

Brief Geologic History of Mud Lake/Mud Creek:

- Valley is oversized north-running drainage channel from Missoula Floods overland sheet flow ~12.5 kya
- Sea level rise and Columbia River valley infill raised valley bottom to present elevation ~2.5 kya
- Woodland Bottoms derived from MSH Pine Creek eruptive materials ~2.5 kya
- Mud Lake, and Mud Creek, likely date from 2.5 kya, Mud Creek drained exclusively into East Fork Lewis
- North Fork Lewis jumped south and joined East Fork Lewis outflow to Columbia River during MSH Kalama eruptive phase, circa 1480 AD, ~528 years ago

Recent Impact to Mud Lake/Mud Creek System:

- August 2004 -- Circle C Rock Products fined $10,840 by Ecology for failing to prevent water pollution during its operations. The gravel quarry used water for washing and crushing rock, and dust control, said Ecology spokesperson Sandy Howard. Ecology inspections in March and April revealed that muddy water was being discharged into Mud Lake. *"The Reflector"*

- June 2007 -- Ecology issued a $160,000 fine against Circle C Rock products for "significant and continuous water quality violations". Maximum daily and monthly turbidity averages should have been below 50 turbidity units (NTU). But most daily and monthly averages were over 120 units, and one month went as high as 2,950 units. Tests for pH also showed alkalinity levels outside an acceptable range. *Ecology News Release*

Consequences of Impacts:

- “If not settled out before being discharged to lakes or rivers, the sediment in turbid water can cover salmon-spawning beds, rendering them useless for future spawning. The sediment can also smother eggs that have already been laid. Out-of-balance pH levels can increase the reactivity of other chemicals in the water, and lead to skin irritation for humans and harmful impacts on fish.” *Ecology news release*

- "That kind of sediment has an adverse impact on salmon," said Scott Morrison, Ecology’s sand and gravel permit manager for Southwest Washington.

Recent Updates:

- November 19th 2007
  - Cary Armstrong, Clark County Water Resources, reported “Circle C is spending a lot of money to totally redesign their sediment control system with the goal being zero discharge...100% infiltration.”
  - “Mud Lake looked better Monday afternoon than I've seen it for sometime.”
  - However…


Dec 6th 2007


Dec 6th 2007

Conclusions:

- Likely no new sediment inputs to the system
- Sediments in the lake appear to be settling out, lake water quality appears to be improving
- However, sediments in the ~0.5 mile Mud Creek channel have reactivated with winter rains, and are being discharged to the Lewis, subject to tidal effects.

Other Data? (1)

- Lower Columbia Salmon Recovery 6-Year Habitat Work Schedule And Lead Entity Habitat Strategy, K. Lower NF Lewis River Subbasin, (LCFRB 2007)
- “Lewis 1 Tidal” mainstem reach viewed as Tier 4, but note use by multiple species

Stream Reaches	Species Presence and Reach Potential						Reach Tier
	Winter Steelhead	Summer Steelhead	Fall chinook	Spring chinook	Coho	Chum	
Designation	*C*		*P*		*P*	*P*	
Lewis 4	L		H		H	H	1
Lewis 6	L		H		H	H	1
Lewis 3	L		H		H	M	1
Lewis 5	L		M		H	H	2
Lewis 7	L		M		L	M	2
Cedar Creek 1a	H				M		2
Cedar Creek 1b	H				M		2
Cedar Creek 3[1]	H				M		2
Cedar Creek 4	H				M		2
Lewis 2 tidal_A[2]	L		L		M	L	3
Cedar Creek 2[1]	M				M		3
Cedar Creek 5	M				L		3
Cedar Creek 6[1,3]	M				L		3
Lewis 1 tidal[2]	L		L		L	L	4
Lewis 2 tidal_B	L		L		L	L	4
Bitter Cr	L				L		4

Other data? (2)

Reach Tier	Restoration v. Preservation Value		Multi-Species Project Benefits Note: project benefits are derived from conditions of limiting factors and not from field observation of site-specific project needs									
	Restoration	Preservation	Access to blocked habitats	Stream channel habitat structure & bank stability	Off channel & side channel habitat	Floodplain function and channel migration processes	Riparian conditions & functions	Water quality	Instream flows	Regulated stream mngt for habitat functions	Watershed conditions & hillslope processes	Food[7]
1	39%	61%	L	H	H	H	H	M	H	H	H	L
1	20%	80%	L	H	H	H	H	L	H	H	H	L
1	49%	51%	L	H	H	H	H	L	H	H	H	L
2	38%	62%	L	H	H	H	H	L	H	H	H	L
2	40%	60%	L	M	H	M	M	L	H	H	H	L
2	42%	58%	L	M	H	M	M	M	H	L	M	L
2	45%	55%	L	H	H	H	M	M	H	L	M	L
2	46%	54%	L	H[1]	H	H	M[1]	M[1]	H	L	M	L
2	38%	62%	L	M	H	M	M	L	H	L	M	L
3	60%	40%	L	H	H[2]	H[2]	H	L	H	L	H	L
3	47%	53%	L	H[1]	H	H	M[1]	M[1]	H	L	M	L
3	29%	71%	L	M	M	M	M	L	M	L	M	L
3	54%	46%	L	M[1,3]	M	M	M[1]	L[1]	M	L	M	L
4	68%	32%	L	H	H[2]	H[2]	H	L	H	H	H	L
4	39%	61%	L	M	M	M	M	L	M	M	M	L

Other info from reports? (3)

- Mud Creek not included in North Fork Lewis River Habitat Assessment (LCFRB 2004)
- However, section 3.3.1 *System Weaknesses* states:
  - At the time of this assessment forest covered only 14 percent of the current floodplain and less than 5 percent of the historic generalized floodplain for the lower 15.5 miles of the NF Lewis River.
  - The lower 15.5 miles of the NF Lewis River was associated with a constrained floodplain, reduced to only 12 percent of its historic area.
  - There has been a severe loss of side channel habitat throughout the lower 15.5 mi of the river.

Other info from reports? (4)

- Section 3.3.3 *Protection/Restoration Opportunities* states:
  - Future restoration of hydromodified habitats in the lower North Fork Lewis River basin should focus on preserving natural channel margins and areas with existing functional floodplain habitats.
  - Wood placement is occurring in the tributary reaches and should be encouraged at [low gradient] sites where the structures have a good likelihood of remaining during storm events.

Other info from reports? (5)

- Section 3.3.3 *Protection/Restoration Opportunities* provides a list of the top opportunities:

- *2. Preservation/restoration: north and south banks, RM 2.0 to 3.1*
- There are two small areas of intact forest within this portion of the Lewis River, one on the south bank between RM 2.0 and 2.7, and the other along the margin of a point bar located on the inside of a tight meander bend at RM 2.9 to 3.1. Historic maps suggest both of these areas may have supported overflow channels. As a consequence, they represent sites with some potential for development of off-channel habitat. Preservation/restoration of floodplain habitats in this area is given a relatively high priority due to the scarcity of functional habitat throughout the first 7.3 miles of Lewis River mainstem channel.

Other info from reports? (6)

- 11. Restoration of tidal slough and floodplain habitats, RM 0.0 to RM 5.0 NF Lewis River.
- Remnant slough, wetland and floodplain surfaces associated with the combined Lewis and Columbia River floodplains persist in the area north and west of the Lewis River between RM 0.0 and RM 5.0. A small amount of undeveloped floodplain also exists east of the river between RM 3.3 and RM 5.0. While these areas currently support relatively limited infrastructure, they are used extensively for agriculture and are separated from the river by a major levee system. Thus, restoration to fully functioning condition would be difficult and expensive. However, there may be opportunities for limited restoration of tidal slough habitat or possibly future conversion of agricultural lands to floodplain forest in this area. This restoration opportunity is given a low priority because of the high cost, degree of difficulty and extensive use of the area in question for agriculture. Similar functional habitats also exist south of the Lewis River in the Ridgefield National Wildlife refuge.

Other Data? (7)

- Anecdotal reports from Plas Newydd landowner who saw salmonids entering the lower section of Mud Creek last fall
- Landowner’s son used to canoe all the way up to Mud Lake, crossing over 3-4 beaver dam/pond complexes.

Mud Creek Conclusions:

- Should not be evaluated like a headwater spawning tributary – it is low gradient floodplain
- Functions like off-channel habitat/rearing refuge, especially during winter flows
- Represents one of the only connected remnant tidal slough habitats in the floodplain.
- Currently experiencing impacts from high sediment levels

Proposal:

- Install 25-30 rootwads/LWD in the lower section of the Mud Creek
- Placing LWD in a soft-bottom stream bed will increase scour, and help incise a channel through the sediments
- Because of the potential for flood and tidal influence to relocate LWD, pieces will be anchored to quick-drive wood pilings

Quick-drive pilings?

- 15’ pilings in 3 min in unconsolidated sediments (Toutle)
- 12’ pilings in 5 minutes in cobbles (Washougal)

LCFEG 2007

Leverage to expand project?

- Ecology has indicated that most, if not all, of the $160k from the fine against the Circle C quarry will be put back into the Mud Lake/Mud Creek system.

Conclusions:

- The Cowlitz Indian Tribe is eager to prepare a full proposal for review by Pacificorp ACC to place LWD in Mud Creek under 2008 funding cycle
- Expected request: $50,000
- Demonstrated ecological need for the project
- Demonstrated benefits to ESA-listed salmonids
- Willing landowner
- Potential to leverage significant increases to project scale and funding.


Questions?