2017 BOISE RIVER FLOOD REHABILITATION
NORFMA CONFERENCE – BOISE, ID SEPTEMBER 26, 2019

Bank Reconstruction Project
Duck Alley Pit Capture

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USDA
The NRCS is an agency of the United States Department of Agriculture. The NRCS offers technical and financial assistance for private agricultural producing lands.

In 2017 the Boise River experienced higher than normal flood flows regulated through upstream reservoirs.

In response to State-Wide flooding on July 27, 2017 the Idaho NRCS gave a press release:

"NRCS Idaho will set aside funding through the Environmental Quality Incentives Program (EQIP) for private land flood recovery efforts. The funds can be used to help address damage to agricultural infrastructure as well as streambank erosion and landslides.

The Duck Alley Pit Capture project is one project funded through EQIP, implemented through a collaborative effort with the landowner, Flood District 10, and Local, State, and federal authorities."
Very high snowpack beginning February 2017 on 2,883 square mile drainage.

“The Lower Boise River has been transformed from a meandering, braided gravel bed river that supported large runs of salmon to a channelized, regulated urban and agricultural river that provides flood control, irrigation water conveyance and recreational opportunities to residents of the Treasure Valley.”

(BREN 2015)
FLOODING EVENT

- Site Location: 1.3 miles west of Linder Road and east of Highway 16. Approximately 4.0 miles southwest of Eagle and 3.0 miles southeast of Star.
- Channel flow overtopped a 325 feet section of the left bank between the river channel and a nearby pond (old gravel pit).
- Water surface in the river was greater than that of the 18 feet deep pond.
- Interstitial flow saturated earth material and degraded cohesive strength of topsoil, sand, gravel, and cobble.
- The riparian forest vegetation was sparse. Woody vegetation and a root matrix were not in place to act as a second line of defense.
- Ultimately, dramatic bank failure occurred. This resulted in approximately 87% of the river flow into the pond, while 17% remained in the existing channel.
THE SITE (APRIL 1, 2016)
THE SITE (JULY 12, 1971)
PROJECT OBJECTIVES

- Redirect base flow back to the recent pre-existing and primary river channel.
- Reconstruct the left bank using primarily bioengineering methods for stability – log root wads, willow bundles, and cottonwood pole plantings.
- Establish willow varieties along the bank and plant over an acre of cottonwood pole plantings.
- Address concerns of the landowner and downstream neighbors of negative impacts from continued flood flows altering adjacent properties.
- Maintain channel hydraulics and biomimicry.
Notes:

- bulk fill material will be parent material, well graded gravel and cobble with fines.
- channel debris clearing will be completed before working on the 1.8 acre construction and fill area. All work done in the primary channel will be completed before reconstruction of the bank begins.
- cottonwood plantings will ensure the upper bank is protected from future flooding events. Tree roots will give more structure to bank cobble material.
- Detail Section A-A and Section B-B are shown on sheet 4.
BULK FILL MATERIAL

- Low cohesive strength
- Required good moisture control for compaction
- Compacted best with vibratory roller machinery
- Most cost-effective source of fill material – removed channel sediment deposits
In Section A-A, view looking southwest:
- Armored fill: 100 ft wide x 4 ft thick x 20 ft deep.
- Sheet6:
  - Top of fill: 2,493 ft.
  - Depth of fill: 2,493 ft.
  - Existing left bank:
  - Soils:
  - Preparing a clean hardened base before installing each fill.

In Section B-B, northwesterly, downstream:
- Pond Side:
- Top of alluvial deposits from bank failure, sheet 5:
- 63 ft, 55 ft, 18 ft:
- Water surface, surveyed Sept. 7, 2017:
- - Bank reconstruction quantities:
  - Length along bank (feet): 325
  - Total volume (cu yds.):
    - Excavation/earth moving: 18,701.5
    - Armored fill: 111.1

Notes:
- Bulk fill material will be parent material, well graded gravel and cobble with fines.
- Bulk fill material installed at 8 inch lifts, compacted with tire equipment or sheepfoot roller.
- The rock riprap portion of fill material is approximately 1,750 cu yds.
- Channel debris clearing will be completed before working on the 1.8 acre construction and fill area. All work done in the primary channel will be completed before reconstruction of the bank begins. Estimated volume = 4,220 cu yds.
- Cottonwood plantings will ensure the upper bank is protected from future flooding events.
- Tree roots will give more structure to bank cobble material.
- All area post construction shall be seeded with approved mix.
Construction
02/26/19

View looking downstream from left bank at breach

Glenwood:
271 cfs
Construction
02/26/19

View looking upstream at sediment removal
Construction
02/27/19

View looking downstream at sediment removal

Glenwood:
326 cfs
View looking downstream from left bank at breach. Sediment removal is nearly complete.

Glenwood: 409 cfs
Construction
03/01/19

Placement of hardened rock core

Glenwood:
389 cfs
View looking downstream from left bank. Hardened rock core (base) installed along entire left bank. Rootwad placement begins.

Glenwood:
359 cfs
Construction
03/04/19

View looking downstream from left bank at breach. Rootwad placement complete. Finish bank height nearly complete. Bulk fill begins.

Glenwood: 330 cfs
Construction
03/05/19

View looking downstream from left bank. Bulk fill.

Glenwood:
321 cfs
Construction
03/06/19

View looking downstream from left bank.

Glenwood:
326 cfs
View from left bank (different location than previous slides). Bulk fill complete.

Glenwood: 724 cfs
River Flow begins to increase
03/07/19
Glenwood:
724 cfs
River flow at bankfull stage
04/19/19
Glenwood:
4,640 cfs
Overtopping bank
04/19/19
Glenwood:
4,640 cfs
Flow had increased
05/14/19
Glenwood:
~6,000cfs
Post high water/flooding event.

View looking upstream from left bank at rootwads and bank reconstruction.
Post high water/flooding event

View at left bank of hardened rock core and scour area from flow over bank
REHABILITATION OBJECTIVES

- Same objectives as original project, less available funding for repairs.
- Rock core repair work and reshaping
- Bulk fill, roller compactor
- Cottonwood poles and willow plantings
- Secondary grade control at “spillway” to control scour
- Project Design completion date: Fall 2019
- Project Implementation date: Winter 2019
THANK YOU

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