Hangman Creek Stabilization & Restoration: Methods to the Madness

Presenter:

Dan Ross

SPOKANE CONSERVATION DISTRICT
FROM THE GROUND UP

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Hangman Creek Contributing Factors to Volatility

- Transboundary watershed (ID/WA, 4 counties)
- Water quality - 303(d) List: fecal coliform, pH, temperature, dissolved oxygen, turbidity (complications to Spokane River)
- Water quantity – flashy hydrology (range of over 20,000 cfs to less than 1 cfs), low critical period flow
- Habitat - heavy agricultural land use (260,000 acres), woody riparian habitat is characterized as absent, highly eroding vertical banks.
- Water Storage Issues – land use changes
- Urban/residential Development


UNDER CUTTING


February 2017 - 10K CFS Runoff Event
Mobilized approximately 16,000 tons of stream bank material from the site… In one event!!!

Erosion Inventory and Assessment - 2003 & 2022

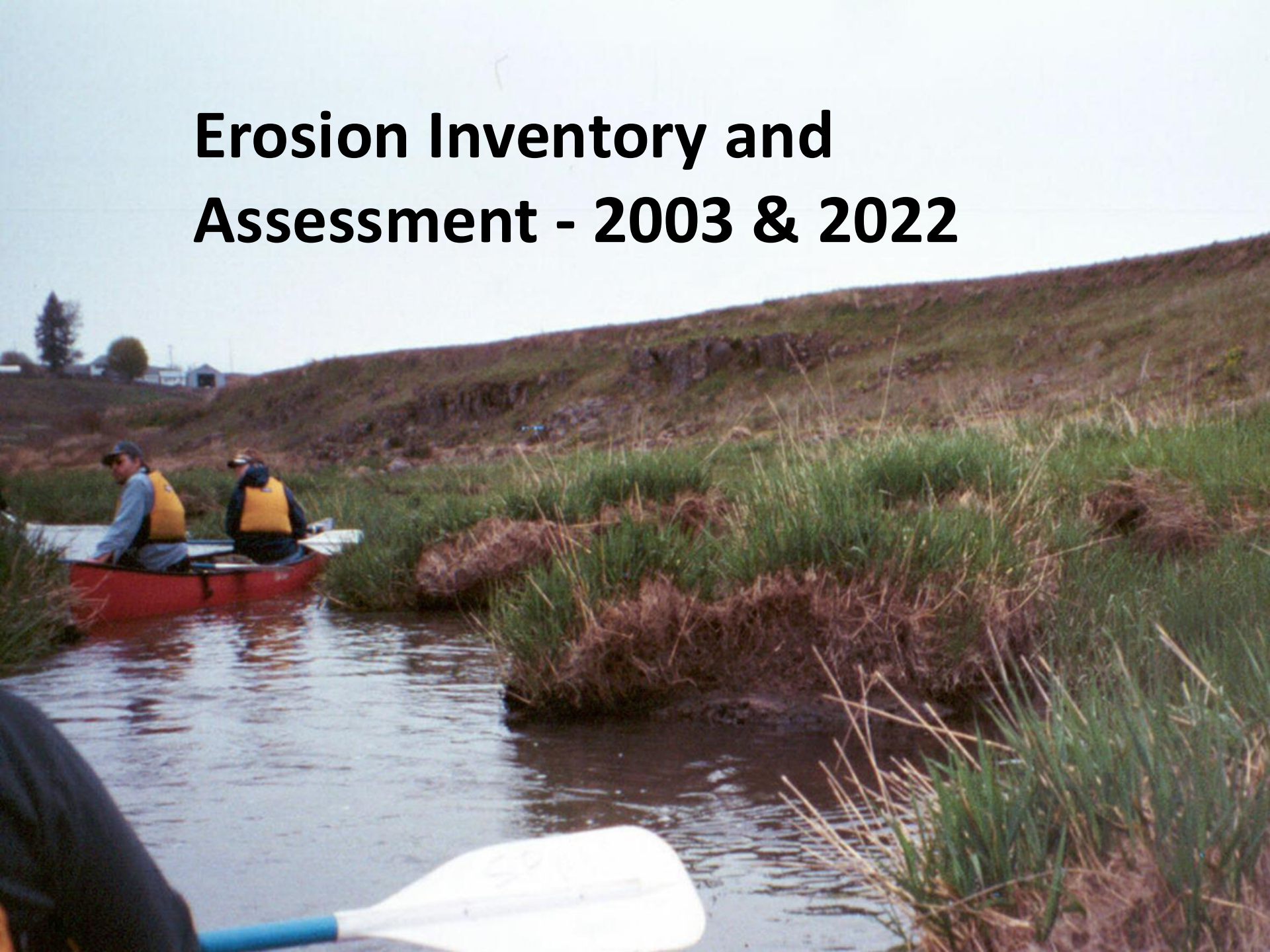


Table 5. Hangman Creek Active Erosion Inventory Results (2003 & 2022)

Reach ID	Reach Length (mi)	Erosion Class I 3-9 (ft)		Erosion Class II 10-28 (ft)		Erosion Class III 29-65 (ft)		Erosion Class IV 66-125 (ft)		Erosion Class V 126-300 (ft)		Total Active Erosion length (ft.)	
		2003	2022	2003	2022	2003	2022	2003	2022	2003	2022	2003	2022
1	4.7	456 (3)	520 (4)	0	0	0	0	0	0	0	0	456 (3)	520 (4)
2	0.4	211(1)	320 (1)	0	0	0	0	0	0	0	0	211 (1)	320 (1)
3	2.6	422 (1)	0	0	0	0	0	0	0	0	0	422 (1)	0
4	0.5	158 (1)	662 (3)	0	0	0	0	0	0	0	0	158 (1)	662 (3)
5	3.6	898 (3)	1,217 (8)	0	0	0	0	0	0	0	0	898 (3)	1,217(8)
6	5.3	3,115 (9)	2,355 (12)	0	0	0	0	0	0	0	0	3,115 (9)	2,355 (12)
7	1.4	1,478 (5)	220 (1)	0	0	0	0	0	0	0	0	1,478 (5)	220 (1)
8	2.0	1,742 (6)	680 (3)	0	0	0	0	0	0	0	0	1,742 (6)	680 (3)
9	1.5	2,323 (6)	320 (2)	0	550 (1)	0	0	0	0	0	0	2,323 (6)	870 (3)
10	1.1	475 (3)	80 (1)	0	700 (1)	0	0	0	0	0	0	475 (3)	780 (2)
11	1.2	845 (5)	1,210 (2)	201 (1)	120 (1)	0	0	0	0	0	0	1,046 (6)	1,330 (3)
12	2.1	1,320 (3)	750 (3)	0	0	0	0	0	0	0	0	1,320 (3)	750 (3)
13	7.4	2,376 (16)	2,505 (9)	370 (1)	750 (2)	0	0	0	0	0	0	2,746 (17)	3,255 (11)
14A	1.9	1,531 (3)	1,415 (2)	264 (1)	900 (1)	0	0	0	0	0	0	1,795 (4)	2,315 (3)
14B	1.1	2,059 (4)	1,220 (3)	241 (2)	500 (1)	0	430 (2)	0	0	0	0	2,300 (6)	2,150 (6)
15	2.3	1,543 (6)	2,335 (8)	3188 (6)	1,660 (4)	0	400 (1)	0	0	0	0	4,731 (12)	4,395 (13)
16	0.8	0	0	0	0	0	0	0	0	0	0	0	0
17	0.7	0	1,100 (2)	0	0	0	0	0	0	0	0	0	1,100 (2)
18	3.3	739 (1)	390 (5)	2,218 (12)	2,675 (9)	2,112 (3)	2,900 (6)	0	0	0	0	5,069 (16)	5,965 (20)
19	4.1	0	0	950 (6)	1,710 (7)	475 (3)	1,090 (3)	370 (1)	250 (1)	0	0	1,795 (10)	3,050 (11)
20	2.4	0	0	1,214 (4)	1,810 (6)	475 (1)	640 (1)	0	0	0	0	1,689 (5)	2,450 (7)
21A	1.3	0	0	1,056 (2)	740 (2)	0	400 (1)	1,531(3)	0	0	0	2,587 (5)	1,140 (3)
21B	1.0	0	0	100 (1)	0	164 (1)	250 (1)	0	0	0	0	264 (2)	250 (1)
21C	3.8	211 (1)	0	739 (2)	180 (1)	650 (2)	325 (1)	2,218 (2)	400 (1)	0	0	3,818 (7)	905 (3)
22	2.0	0	0	202 (1)	0	0	450 (1)	686 (1)	0	0	0	888 (2)	450 (1)
Totals	58.5	21,902 (77)	17,299 (69)	10,743 (39)	12,295 (36)	3,876 (10)	6,885 (17)	4,805 (7)	650 (2)	0	0	41,326 (133)	37,129 (124)

Prioritization

Stabilization

Restoration

Stabilization Timeline

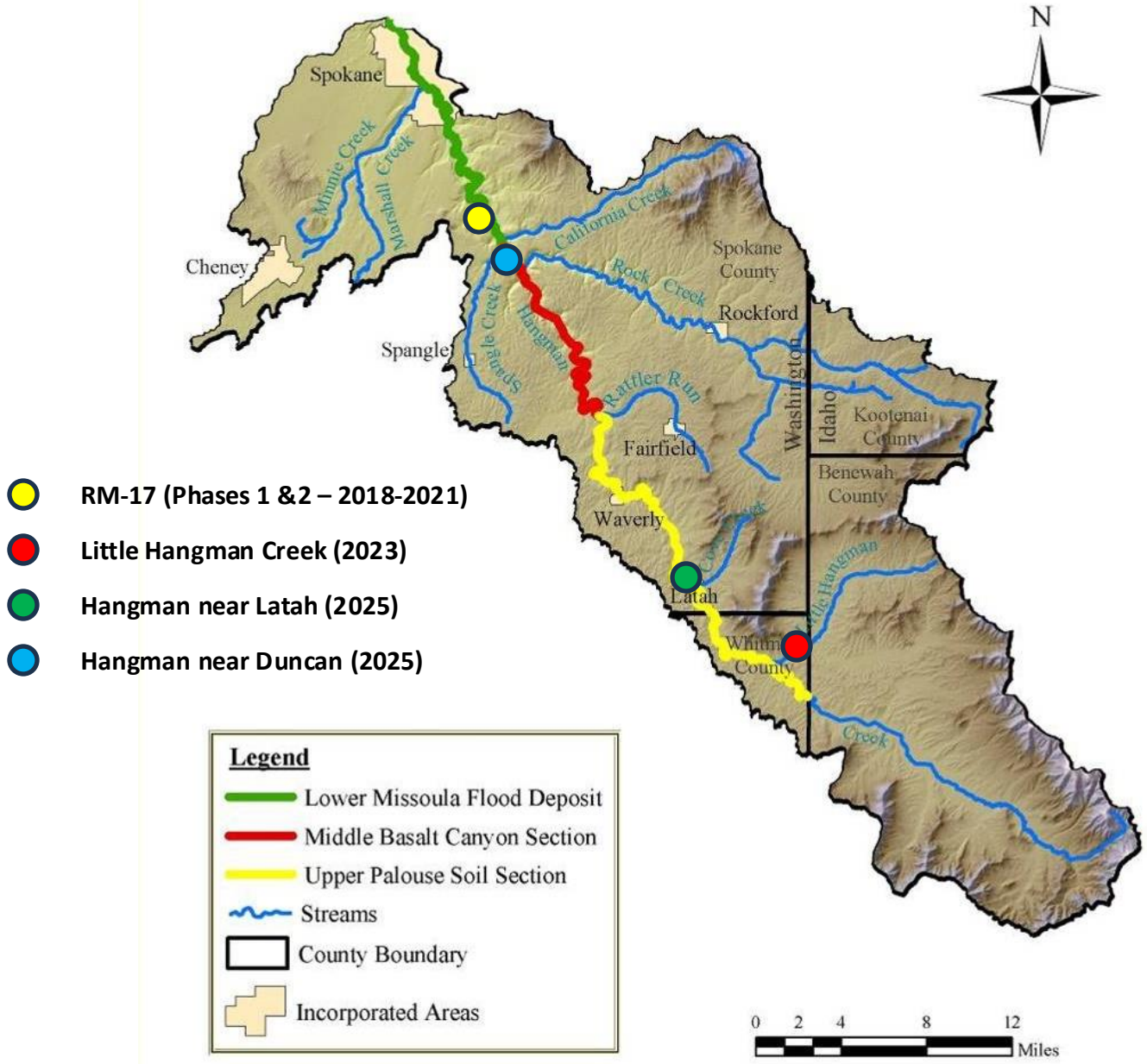
- Site Assessment & Cost Estimate (1-2 Months)
- Funding Request(s) (4-6 Months)
- Hire Design Engineer (1 Month)
- Prelim. Design Development (2-3 Months)
- Prelim. Design Review w/Agencies (2-3 Months)
- Finalize 90% (Permit Ready) design (1-2 Months)
- Submit Permit Applications (1 Month)
- Obtain Permits (6-8 Months)
- Bidding process (1 Month)
- Construction Phase (1-3 Months)

Implementation Process Can Take up to 2.5 years!

Restoration Timeline

- Native grass seeding - Year 1
- Weed maintenance - Year 2
- Tree/shrub installation - Year 3
- Maintenance - 3 to 5 years

Randy Baker
Riparian Program Lead
509-535-7274 Ext. 220


N
Spokane
Minnie Creek
Marshall Creek
Cheney
California Creek
Rock Creek
Spokane County
Rockford
Spangle
Spangle Creek
Hangman
Rattler Run
Fairfield
Washington
Idaho
Kootenai County
Benewah County
Waverly
Latah
Whitman County
Little Hangman
Creek
RM-17 (Phases 1 &2 – 2018-2021)
Little Hangman Creek (2023)
Hangman near Latah (2025)
Hangman near Duncan (2025)
Legend
Lower Missoula Flood Deposit
Middle Basalt Canyon Section
Upper Palouse Soil Section
Streams
County Boundary
Incorporated Areas
0 2 4 8 12
Miles

Hangman Creek RM-17 - Phase 1 (2018-19)


Rock Toe Protection
Coir Erosion Fabric


Woody Revetment Bank

RM-17 Phase 1 - Construction Completed July 2019


RM-17 Phase 2
Started Construction:
June 2022


HITACHI


Fabric Encapsulated Soil Lift – FESL


Bank 1
Before


Bank 1
After


Bank 2
Before


Bank 2
After

Bank 3
Before


Bank 3
After


Streambank Stabilization
Riparian Restoration

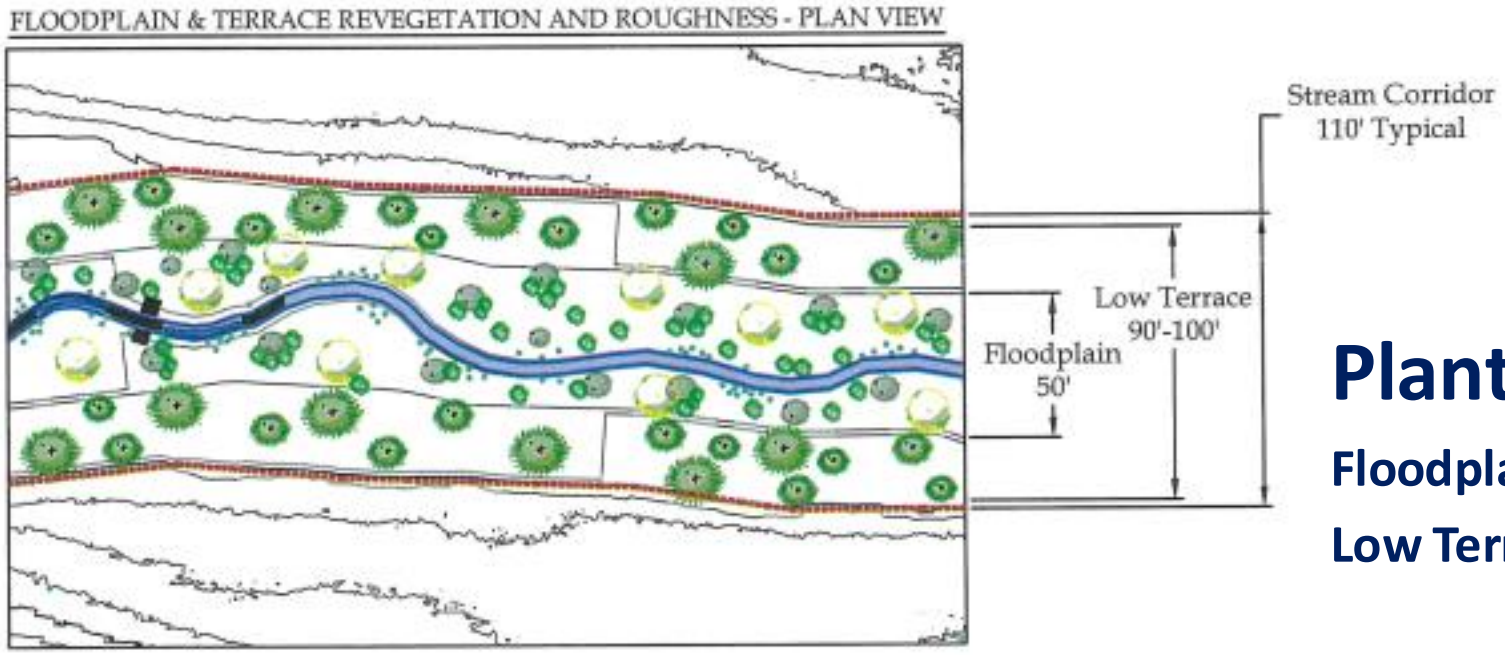
Hangman Creek River Mile 17 Restoration

- 4 landowners
- 2 Phases (5 years)
- > 1 mile of bank treatments
- Restoration planting/maintenance - Ongoing
- $788.5K Combined Initial Investment

Little Hangman Creek Restoration - 2023

Cause & Effect:

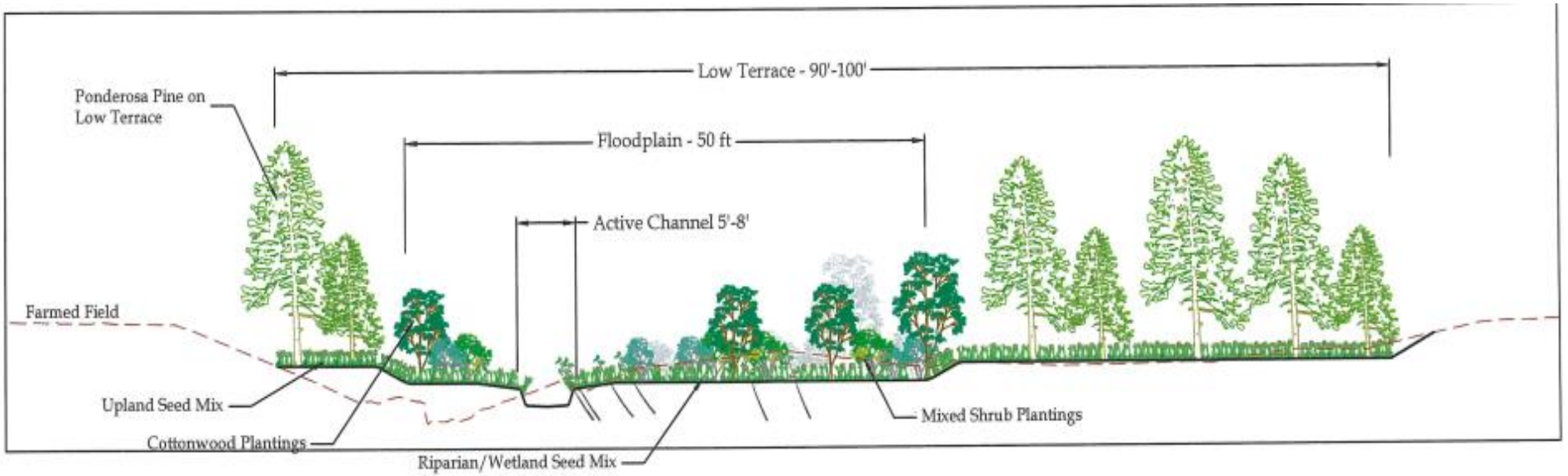
Straightened & Incised Channel (Human Influenced) =
No floodplain access = Active Bank Erosion =
Instability & Sediment Contributions = Poor Habitat



Planting Area:

Floodplain = 4.3 Ac.

Low Terrace = 3.8 Ac.

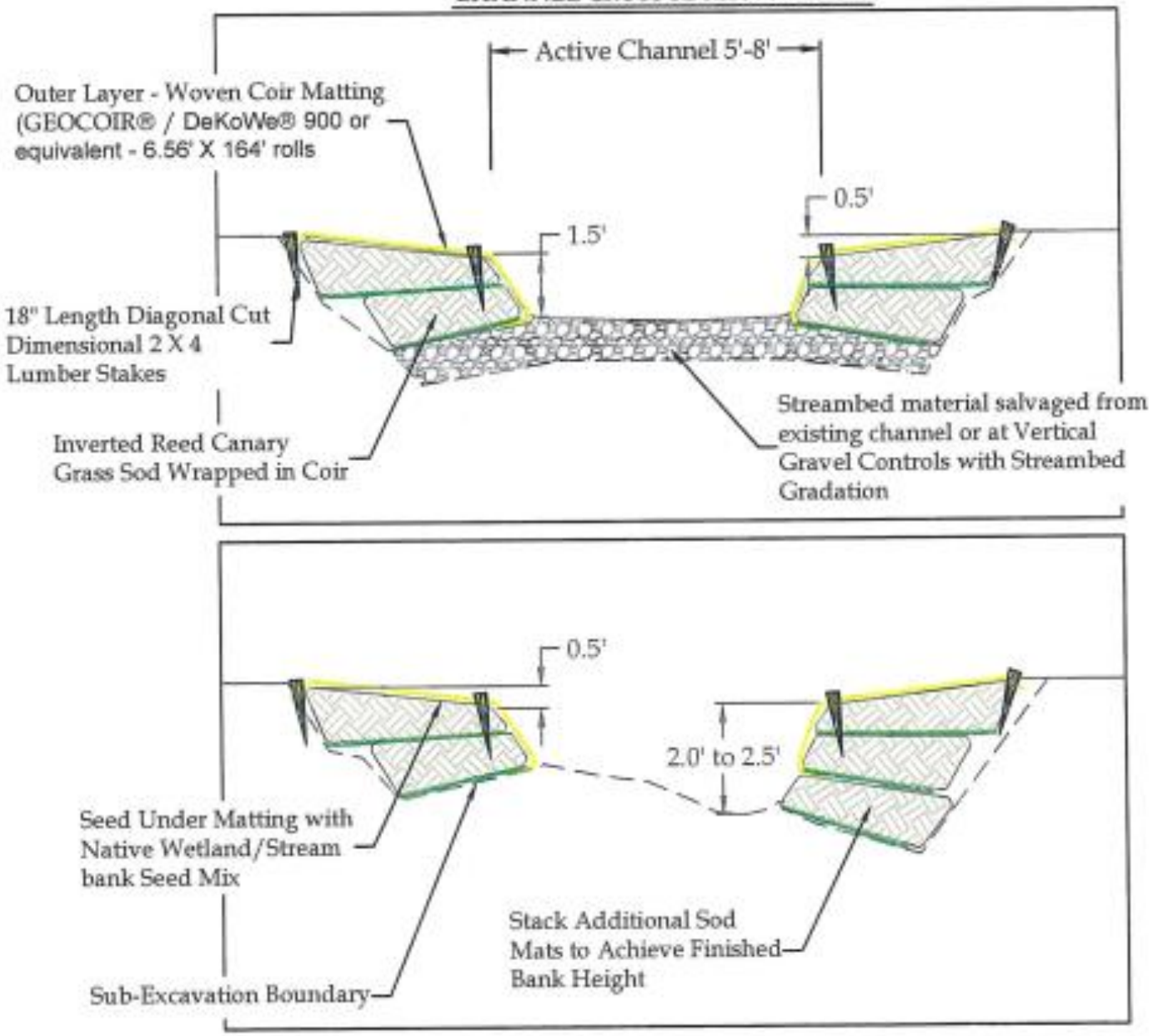


Corridor Excavation = Approximately 30,400 YD^3

(3,040 Standard Dump Truck Loads)


Channel Re-establishment:
Meanders & Floodplain Access

CHANNEL CROSS SECTION DETAIL




ARROW
ARROW
ARROW


Bobcat

Little Hangman Creek Restoration:

- Construction Completed October 2023
- Restoration planting/maintenance – Ongoing
- 4,570 L.F. of Stream Stabilization
- $690K Combined Initial Investment

Questions?

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