Nash Run Stream Restoration Project

MWCOG Stream Restoration Technical Session

Project Site

Nash Run Watershed

Nash Run

Present Site Conditions

- Watershed size: 0.7 sq miles
- Stream Length: 1430ft
- Private Properties: 50+
- Load to the Anacostia: 33.5 tons/yr. erosion
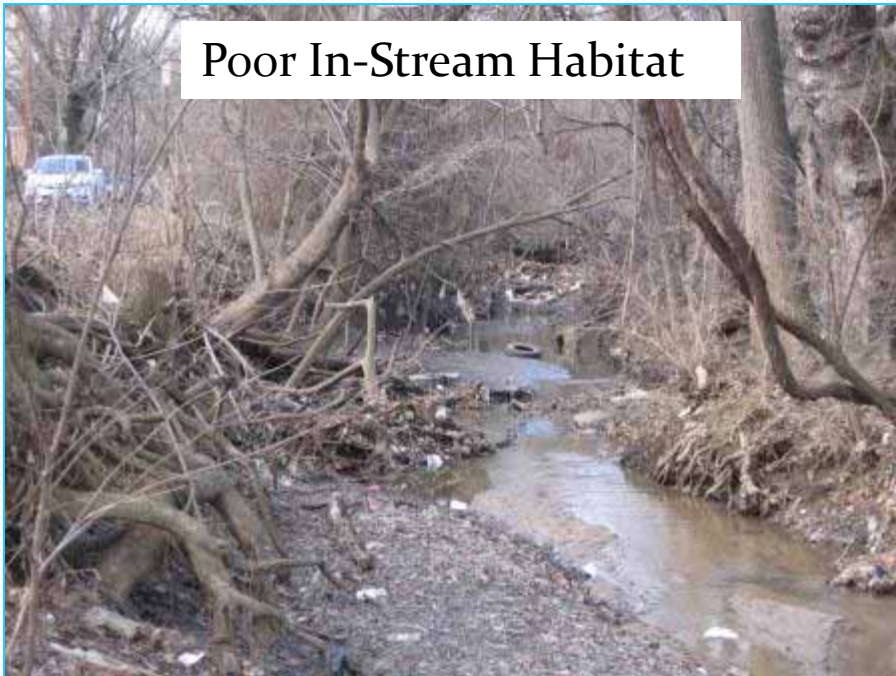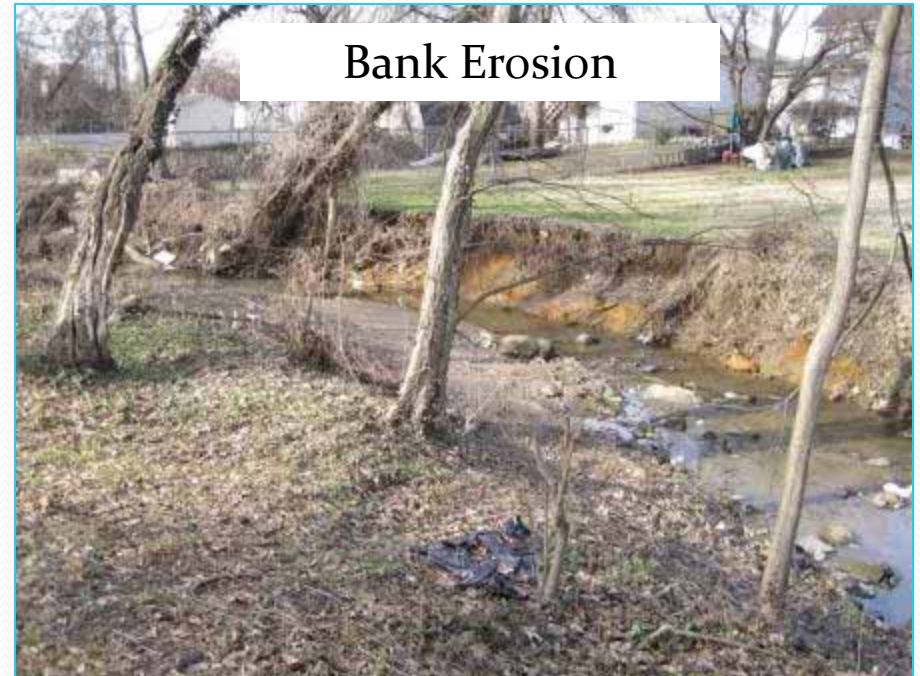
FEMA 100yr. Floodplain

Trash

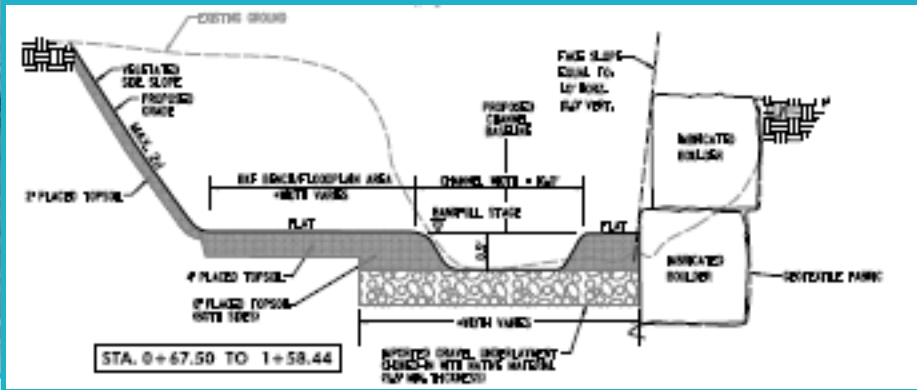Poor In-Stream Habitat

Bank Erosion

Upstream Trash Trap

Floodplain Reconnection Design

- Create a low floodplain bench in relation to current stream elevation
- Remove 9500 cubic yards of stream bank
- Create 6" floodplain on both sides of stream
- Highly connected riparian zone

STA. 0+67.50 TO 1+58.44

Protocols Used

- Protocol 1: Prevented Sediment
  - 345ft monitored segment over 15 months with bank pins and soil testing
- Protocol 2: In-Stream Nutrient Processing
  - Estimated hyporeic zone calculation
- Protocol 3: Floodplain Reconnection
  - Too small of an area for watershed size (0.22% floodplain area to watershed size)
- ~~Protocol 4: Dry Channel RSC~~

Protocol 1

- **Project Length:** 1269.2 linear feet.
- **Monitored Length:** 345 linear feet, or 27 percent Nash Run.
- **Calculation:** The computed total annual stream bank erosion rates extrapolated from the existing stream bank monitoring data is as follows:

  (33.5 tons/yr) / (345 ft) = 0.0971 tons/yr/ft

  1269.2 ft * 0.0971 tons/yr/ft = 123.2 tons/yr

- **Reductions- Nitrogen: 295.8 lbs/yr.; Phosphorus: 94.9 lbs/yr.; and TSS: 123.2 tons/yr.** based on an avg. soil density value of 2600 lbs / cubic yard (conversion factor of 1.3 for yd^3 to tons for avg. materials).

Protocol 2

- **Project Length:** 1269.2 feet
- **Channel Width:** 10 feet
- **Calculations:**
1. $[(5\ ft) + (10\ ft) + (5\ ft)]$ * 5 ft * 1269.2 ft = 126,920 ft^3 (vol. hyporheic box)
2. 126,920 ft$^{3^*}$ / 27 ft^3 /cy = 4700.7 cy
3. (4700.7 cy * 2600 lbs/cy) / 2000 lbs/ton = 6,111 tons
4. 0.000195 lbsN/ton/day * 6111 tons * 365 day/yr = <u>434.9 lbs nitrogen/yr</u>

Protocol 3

- **Watershed Area:** 467.2 acres
- **Estimated Floodplain Area:** 1.05 acres
- **Floodplain/Watershed:** .22% (not the 1% threshold needed)
- *Credit is miniscule due to small floodplain to watershed area ratio.*
- *Floodplain reconnection design but not much floodplain reconnection credit* ☹

Load Reduction Comparison

Method	TN	TP	TSS
Old Rate	50.8 lbs/yr	8.8 lbs/yr	6472.9 lbs/yr
Interim Rate	190.4 lbs/yr	172.6 lbs/yr	110,166.6 lbs/yr
Protocol 1	295.8 lbs/yr	94.9 lbs/yr	246,482 lbs/yr
Protocol 2	434.9 lbs/yr		
Protocol 3	*0.08 lbs/yr*	*0.01 lbs/yr*	*4.90 lbs/yr*
Protocol 1+2+3	**730.8 lbs/yr**	**94.9 lbs/yr**	**246,487 lbs/yr**

Legacy Sediment Projects

- At Nash Run 9,500 cubic yards is being removed to create a low floodplain bench. Our design team, JMT, estimates that could be a one time removal credit of:
    - 29,640 lbs of N
    - 9,510 lbs of P
- Would this give perverse incentive to excavate unnecessarily or is it the right thing to do?

Lessons Learned

- Accuracy vs. Simplicity and Associated Costs
- Include calculations in design scopes of work
- Training needed
- Must do it to learn it

Big Thanks!!!