BLACK HAMMOCK RESTORATION

Stakeholder Meeting

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August 14, 2013

Meeting Agenda

- Work Performed to Date
- Restoration Concepts
- Final Recommendation
- Work Remaining

Work Performed to Date

- Field reconnaissance (Salt and Sweetwater Creeks)
- Identification of potential areas for improvement
- Development of survey plan
- Detailed survey
- Updated H&H model using SWMM5
- Development of long-term continuous simulation (5 year)
- Identification and refinement of proposed concepts
- Preliminary pollutant load analysis results
- Preliminary conceptual costs estimates

Restoration Concepts – Background Information

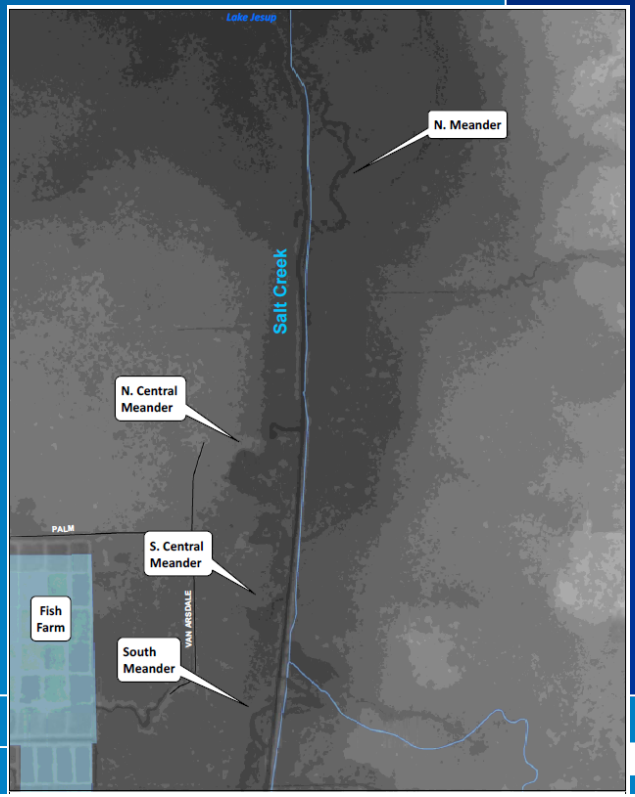
- Performed detailed survey in Salt Creek and limited survey in Sweetwater Creek
- More restoration opportunities identified in Salt Creek
  - Number of historical meanders
  - Favorable topographic conditions
  - Publicly owned lands
- Collected 761 survey points in Salt Creek
- Collected 94 survey points in Sweetwater Creek

Restoration Concepts – H&H Analysis

- SWMM 5
  - Long-term continuous simulation (long-term behavior & responses of creek systems)
  - Design storm events (permitting)
  - Establish baseline and analyze proposed conditions
- Continuous Simulation
  - 5-Year Period (1997 through 2001)
  - OIA Rainfall Data
  - Lake Jesup Measured Stages
  - Baseflow of 1 cfs and 3 cfs (dry & wet seasons)

Restoration Concepts – Salt Creek

- Salt Creek
  - Several opportunities to divert flow from main channel to floodplain meanders
  - Promote water quality treatment/attenutation
  - Most meanders deeper than main channel
  - Four primary areas identified:
    - North
    - North Central
    - South Central
    - South



Salt Creek – Proposed Alternatives

- Two general options considered to promote flow to meanders:
  - **Alternative 1:** Removal of a portion of the spoil berm to re-establish the historical connection of Salt Creek to the meander
  - **Alternative 2:** Removal of a portion of the spoil berm to re-establish the historical connection of Salt Creek to the meander and inclusion of a 1-foot (low-flow) high diversion weirs in Salt Creek at the entrances to the South and North meanders

Salt Creek – Alternative 1

- Remove spoil berm & perform grading from the Creek (at the bottom elevation) to 40 to 100 feet into the meander.
- Grading of meander to achieve an approximate 5-foot bottom width and 3:1 side slopes
- Rip-rap at the Salt Creek/meander connection to provide stabilization.
- Improve downstream connection of the meander back into Salt Creek (only required at the South meander)

Salt Creek – Alternative 2

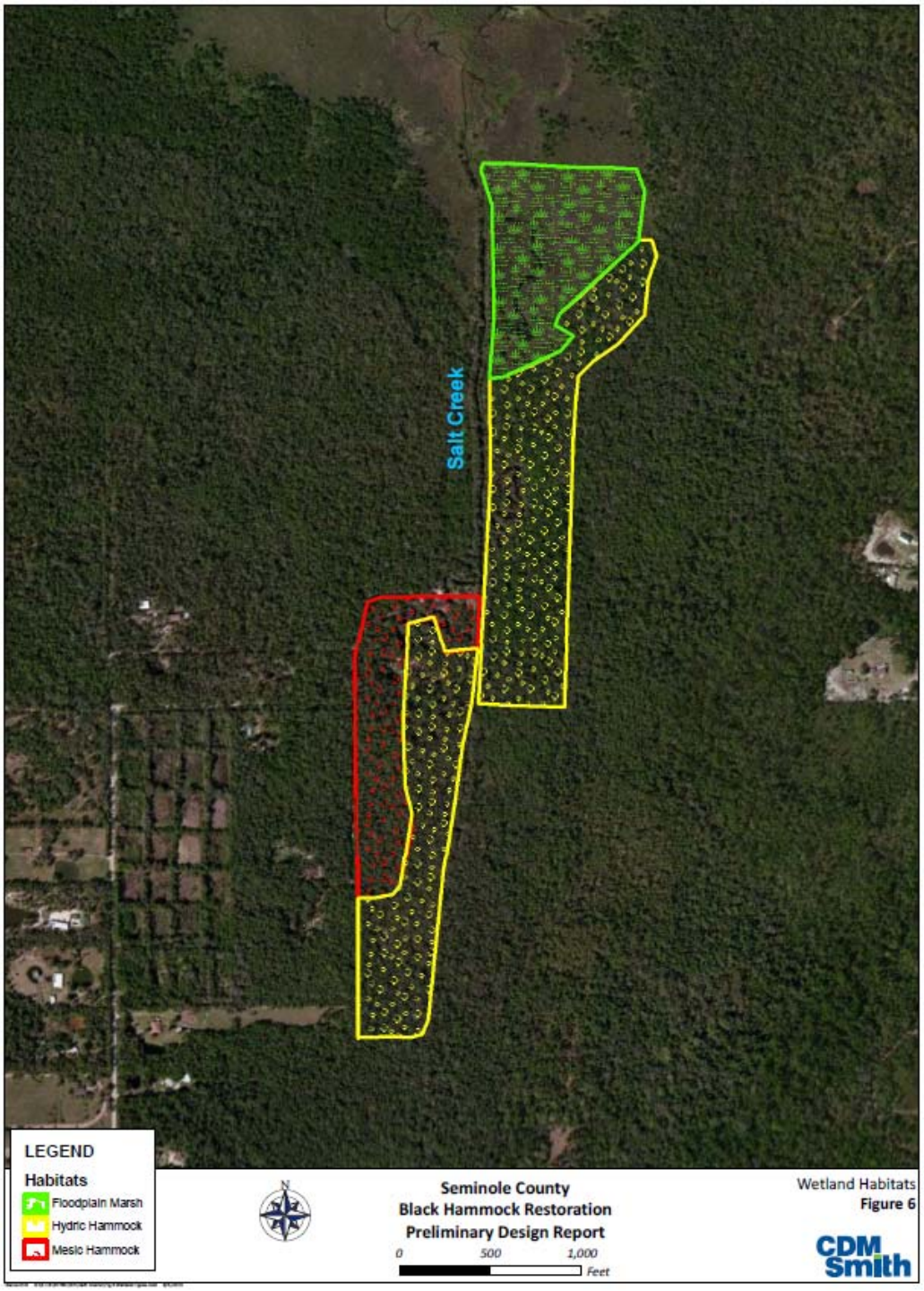
- Identical to Alternative 1
- Addition of 1-foot high diversion weirs within the main channel at the entrances to the South and North meanders
- Diversion weirs not proposed at South Central & North Central Meanders:
  - Flow into meander is already proposed path (SCM)
  - Downstream connection to Salt Creek flows through private property (NCM)

Salt Creek – Culvert Improvements

- Replace major culvert crossings upstream of restoration areas
  - Inconsistent sizing
  - Frequent debris blockages
- Replace major culvert crossings larger horizontal elliptical reinforced concrete pipe (HERCP) or concrete box culvert (CBC)
- Install baffle box at Packard Ave. crossing

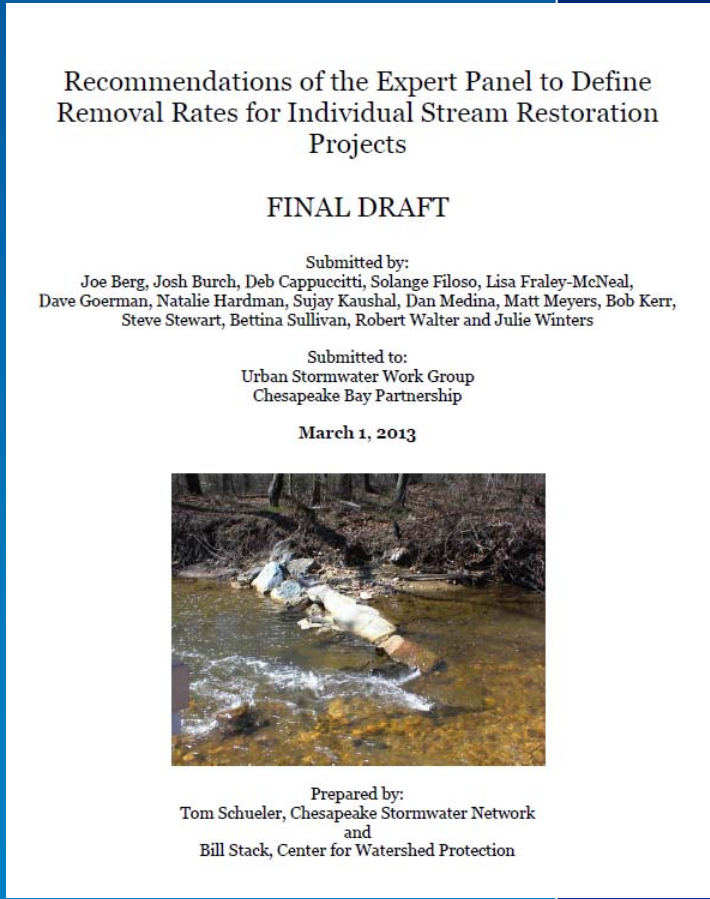
Wetlands Evaluation

- Three primary habitats
- Some upland vegetation species present
- Re-connecting meanders may increase stream habitat
- Recent SHWL are near ground surface
- Historic SHWL 1-3.5 feet abs (depending on habitat/area)
- Areas would benefit from increased frequency of inundation



Pollutant Load Analysis

- "The potential for nutrient reduction (total nitrogen and total phosphorus) will be evaluated using published removal efficiencies….."
- No readily available published removal efficiencies for stream restoration BMPs
  - FDEP approved efficiencies for BMAPs
  - Draft Statewide Stormwater Rule
- Most recent (and comprehensive) work for stream restoration BMPs completed for Chesapeake Bay TMDL



Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects

FINAL DRAFT

Submitted by:
Joe Berg, Josh Burch, Deb Cappuccitti, Solange Filoso, Lisa Fraley-McNeal, Dave Goerman, Natalie Hardman, Sujay Kaushal, Dan Medina, Matt Meyers, Bob Kerr, Steve Stewart, Bettina Sullivan, Robert Walter and Julie Winters

Submitted to:
Urban Stormwater Work Group
Chesapeake Bay Partnership

March 1, 2013

Prepared by:
Tom Schueler, Chesapeake Stormwater Network
and
Bill Stack, Center for Watershed Protection

Pollutant Load Analysis (cont.)

- Expert panel charged with reviewing available science on the nutrient and sediment removal performance associated with urban stream restoration projects
- Developed 4 general protocols used to define pollutant load reductions associated with individual stream restoration projects
- Each protocol has associated methodology for estimating load reduction (TN, TP & TSS)
- Protocol 3 (Credit for Floodplain Reconnection Volume) – most applicable to Salt Creek improvements

Floodplain Reconnection Volume Protocol

- Provides annual mass sediment and nutrient reduction credit for projects that reconnect channels to the floodplain over a wide range of storm events
- Credit for baseflow is given for projects with more frequent floodplain connectivity and established floodplain wetlands
- Wetland-like treatment used to compute load reduction attributable to floodplain deposition, plant uptake, denitrification and other biological and physical processes
- Assumes TSS, TN and TP removal occurs only for volume of annual flow that is effectively in contact with the floodplain

Floodplain Reconnection Volume Protocol

- Designs that divert more stream runoff during smaller storm events (e.g., 0.25 or 0.5 inches) receive greater nutrient credit
- Floodplain connection volume afforded by a project is equated to a wetland volume so that a wetland removal efficiency can be applied
- Removal efficiencies for TN and TP can range from 0 to 16 percent and 0 to 24 percent, respectively

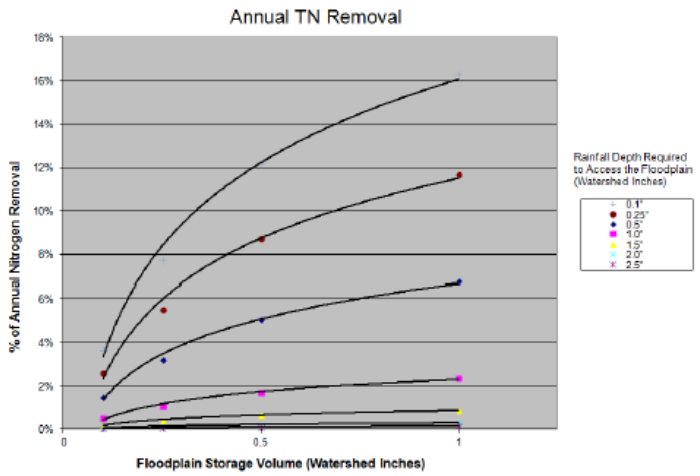


Figure 4. Annual TN removal as a function of floodplain storage volume for several rainfall thresholds that allow runoff to access the floodplain.

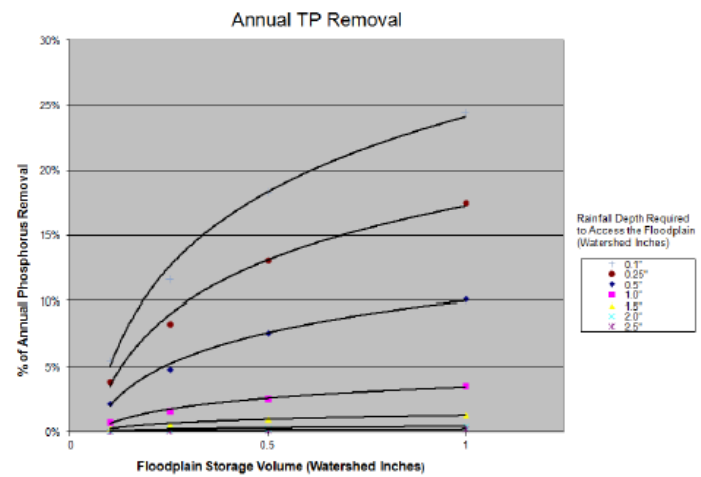


Figure 5. Annual TP removal as a function of floodplain storage volume for several rainfall thresholds that allow runoff to access the floodplain.

Sweetwater Creek

- Pronounced depressional areas on west bank of creek
- Depressional areas significantly higher (3.5 to 4 feet) than the invert channel bottom of the main stem of Sweetwater Creek
- Diversion of flow would require more of an “engineered” system
- May lose benefit of spoil banks capturing existing off-site runoff
- Property boundaries limit extent of restoration