Proposed Fix to Protocol 3

USWG – January 17, 2022

Overview

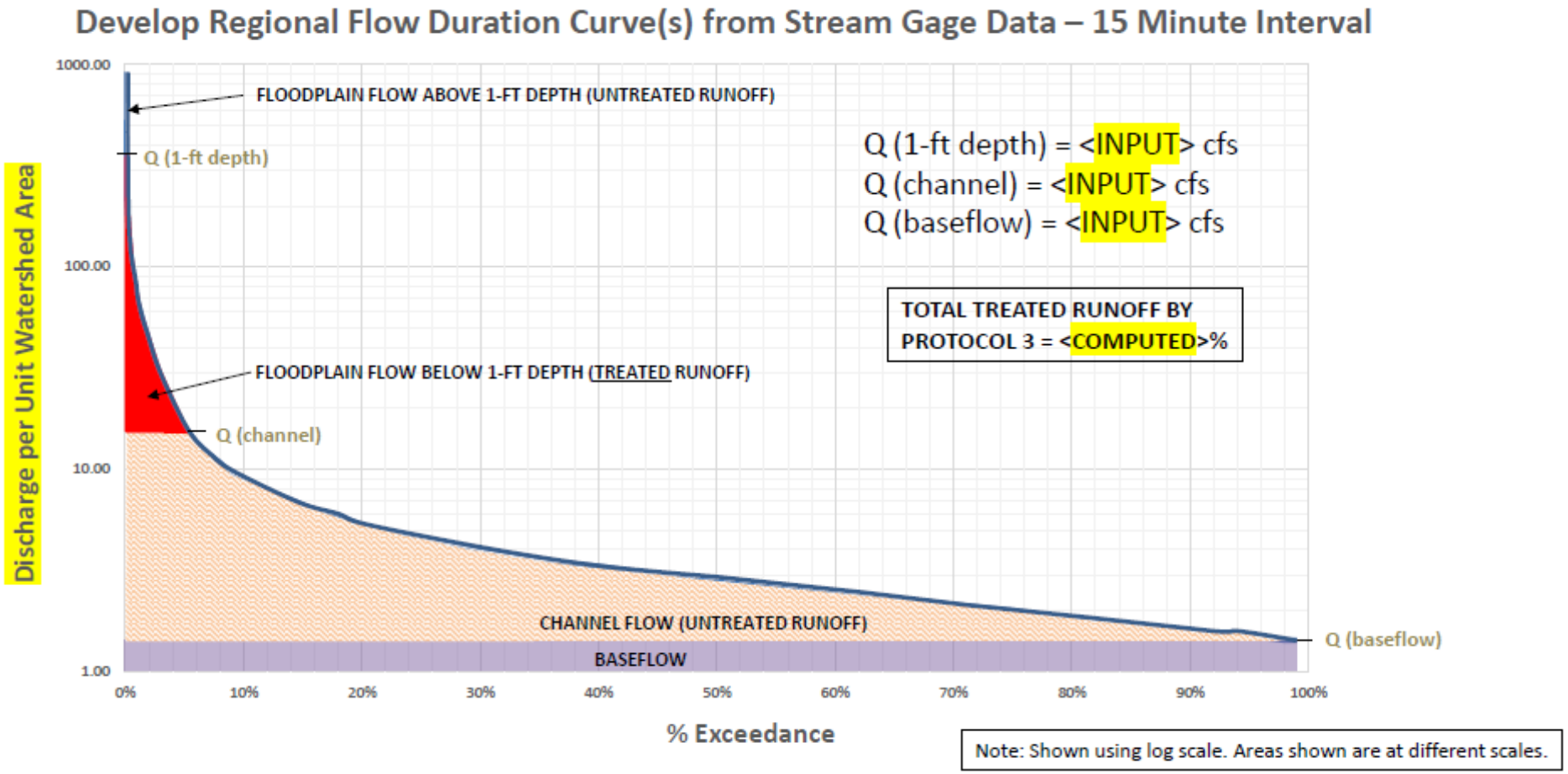
- Protocol 3 Memo approved by WQGIT in October 2020
- Early last year, issue was identified by group members
- Series of 4 calls and many emails to discuss potential solution
- This presentation only introduces the issue and the general approach being proposed
- Still waiting on some final data and edits. Full proposal will be distributed soon for full review and comment.

Protocol 3 Background

Summary of Areas of Consensus for P-3

- The credit should be based on the difference in load reduction based on a before and after application of P-3 to individual projects.
- Hydraulic modeling defines the extent of reconnection boundaries for the FTZ, based on critical floodplain flow velocities where sediment trapping and filtering can be expected.
- Retain the one-foot max elevation above the floodplain as the upper limit for effective runoff treatment in the FTZ, unless a higher elevation is justified by floodplain H&H modeling.
- Multiply the FTZ by the appropriate wetland removal rate established for floodplain wetland restoration projects, as defined by NTW EPR to determine project load reduction.
- Rely on downstream flow methods to estimate annual volume of storm runoff diverted into the floodplain for treatment
- Recommend standard methods for defining baseflow channels, separating baseflow from storm flows and processing appropriate USGS flow gage data

Figure E-1. *Flow Duration Curve for calculating floodplain treatment (Altland 2019).*



Non-Tidal Wetland Removal Rates

Table 13. Floodplain Wetland Removal Rates in Prior CBP Expert Panel Reports			
Wetland BMP Category	Pollutant Removal Rate (compared to pre-restoration)		
	Total N	Total P	TSS
NTW Restoration	42%	40%	31%
NTW Creation	30%	33%	27%
NTW Rehabilitation	16%	22%	19%
[1] as outlined in expanded lit review and recently approved EPR (NTW EP, 2020)			

Restoration: Wetland absent or degraded. Hydric soils present

Rehabilitation: Wetland present w/ degraded function

Creation: No wetland present, no hydric soils present

The Issues

- New Protocol 3 may not properly "scale" the credit to account for more or less extensive floodplain restoration projects (whether by length or acres of reconnected floodplain).

Table 1: Comparison of Floodplain Treatment Volume for Two Hypothetical Project Sites Using Protocol 3*		
	Site 1	Site 2
Length of Restoration Site (miles)	1.5	3.0
Restored FTZ Area	14.0	24.0
Upstream Contributing Stream Length (Miles)	4.0	4.0
Bulk Density (lb/cf)	55	55
Proposed increase in treatable flow	39%	39%
% Wetland Restoration	80%	80%
% Wetland Rehabilitation	20%	20%
TSS Removed per year (tons)	**256.5**	**256.5**
TN Removed per year (lbs)	**201.0**	**201.0**
TP Removed per year (lbs)	**56.8**	**56.8**
*See Appendix B for calculation details		

The Issues

- Lack of support for relaxing the crediting cap that limited nutrient and sediment reductions to the first one foot of water on the floodplain in certain circumstances for projects that otherwise meet the qualifying conditions.

Proposed Solutions

The group unanimously supported the conclusion of this literature review and recommends reverting to the original language from the 2014 Expert Panel Report, which states:

“The maximum ponded volume in the floodplain that receives credit should be 1.0 foot to ensure interaction between runoff and wetland plants.” (USR EP, 2014)

Proposed Solutions

- **Establish the volume of sediment delivered to the site.** Similar to the 2020 Protocol 3 method, the fix would use CAST to establish the sediment load delivered to the project site. The load would then be divided by the average bulk density of floodplain sediments from the CDFN sites, 55 lb/cf.

- **Establish the sediment storage capacity of the floodplain.** The floodplain storage capacity is based on the mean vertical accretion rate from McMillan and Noe (2017) of 0.33 in/year. This depth is multiplied by the restored floodplain acreage to determine the storage capacity.

- **Determine the pollutant removal credit using the floodplain storage efficiency.** The sediment storage efficiency is simply the volume of sediment storage capacity divided by the volume of sediment volume delivered to the site. Therefore, the final credit would be calculated by multiplying the CAST load by the sediment storage efficiency and the percent treatable flow (which is unchanged).

Proposed Solutions

- Provide the option to update their floodplain storage effectiveness values based on 3-years of post-construction monitoring of floodplain sediment trapping. Pending approval by the states, practitioners will be able to replace the 0.33 in/yr vertical accretion rate from McMillan and Noe (2017) with well-supported, site-monitored data.

- This approach is wholly consistent with the approved recommendations for monitoring prevented streambank erosion under Protocol 1 (Chesapeake Bay Program, 2019).

Proposed Next Steps

- CSN will be incorporating final data received from CDFN and Big Spring Run. Memo will be updated and reviewed by Group 4 members.
- Memo will be sent out to USWG, kicking off a 30 day review period.
- Response to comments will follow.
- Decision will be requested on acceptance of the proposed revision, hopefully during March USWG meeting.
- Original Protocol 3 report will be revised to reflect new changes.