

Single-thread vs Anastomosing Channels:

Exploring the form and ecology of pre-colonial streams in the Anne Arundel County Coastal Plain



A cooperative project with:
Anne Arundel County Department of Public Works
Watershed Protection & Restoration Program

Progress Report Period:
August 2019 – September 2019

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Work Component 1: Site Identification and Reconnaissance		
Tasks	Current Status	Planned for Next Reporting Period
Archive Analysis of Historical Maps	No activities conducted for this task during the reporting period	No activities planned for the next reporting period
Aerial Photography Analysis	No activities conducted for this task during the reporting period	No activities planned for the next reporting period
2017 Lidar Analysis	No activities conducted for this task during the reporting period	No activities planned for the next reporting period
River Reconnaissance / Field Activities	No activities conducted for this task during the reporting period	No activities planned for the next reporting period

Work Component 2: Site Scale Exploration, Data Collection, and Analysis		
Tasks	Current Status	Planned for Next Reporting Period
Investigation of soil stratigraphy and legacy sediment occurrence	Longitudinal coring completed at mainstem and tributary sites at Bacon Ridge Branch.	Begin of examination of Bacon Ridge longitudinal cores for stratigraphy analysis of sediment color and geochemical properties Additional cross-sectional cores to be collected at Bacon Ridge following resolution of core method on dry legacy soils. Paleoclimate core sampling at Main Creek planned for Q4 2019 before ground freeze
Pollen and macrofossil analysis within soil strata	Paleo-coring completed at Bacon Ridge Branch on Bacon Ridge Branch, including Russian peat core samples collected for macrofossil analysis.	Begin of examination of Bacon Ridge cores for pollen and macrofossil analysis Paleoclimate core sampling at Main Creek planned for Q4 2019 before ground freeze
Sediment aging activities	No activities conducted for this task during the reporting period	Particulates within Bacon Ridge cores to be identified and sent for age dating

Work Component 3: Reporting		
Tasks	Current Status	Planned for Next Reporting Period
Report Development	No activities planned at this time	No activities planned at this time
Journal Article Preparation	No activities planned at this time	No activities planned at this time
Presentation to WPRP Staff	No activities conducted for this task during the reporting period	No activities planned at this time

Additional Notes or Comments for Reporting Period:

Fieldwork at Bacon Ridge Branch to collect longitudinal cores for paleoecological analysis (*i.e.* pollen, macrofossils, and age dating) was conducted the week of September 10th, 2019. A series of Vibracore and Russian peat cores were collected along ~1km of the main-channel of Bacon Ridge branch, from above Chesterfield Road to the bottom of the area currently undergoing restoration, with an additional core taken from within-channel into the bed along an incised main tributary. Cores were collected until refusal and range from ~1m to over 4.5m in depth.

Despite wet conditions in the floodplain during initial site reconnaissance, dry legacy sediment within the floodplain during this field campaign made vibracoring more difficult than anticipated, resulting in a preferential selection of core placements (*e.g.* floodplain depressions, hummock clearings, within-channel, and upstream marsh). While this did not cause setbacks for paleoclimate coring, cross-sectional cores across the floodplain for additional stratigraphic information and investigation of legacy sediment occurrence (Work Component One, Task 2) requires revisiting alternative methods for collection in drier/valley margin floodplain locations.

Main Creek has been selected as the second study location due to the presence of damp floodplain soils, incised channel, ease of access, in-channel wood, and presence of bogs in nearby watersheds. Fieldwork is currently being coordinated with USGS Florence Bascom Science Center (formerly named USGS Paleoclimate Center) and is anticipated to take place in Q4 2019 before soil freeze. Sampling will follow similar design to Bacon Ridge Branch, including longitudinal soil cores over ~1km of channel, and using both vibracores and Russian peat corers.

To date, thirty wood samples across thirteen sites have been collected and sent for taxonomic analysis and identification to collaborative partners. Additional bank and pre-colonial sediments will be collected at additional sites and sent for pollen and macrofossil analysis after the conclusion of preliminary longitudinal core examination and a successful identification of strata (and distinguishing characteristics) of interest.



Figure 1: USGS scientists begin vibracore sampling in the floodplain at Bacon Ridge Branch near Chesterfield Road in Annapolis.



Figure 2: USGS scientists cap a vibracore sample in the floodplain at Bacon Ridge Branch near Chesterfield Road in Annapolis.



Figure 3: USGS scientists insert a vibracore sample in a floodplain depression at Bacon Ridge Branch near Chesterfield Road in Annapolis.



Figure 4: USGS scientists discuss Russian peat core sample collection for uncompacted macrofossil samples in a floodplain depression at Bacon Ridge Branch near Chesterfield Road in Annapolis.



Figure 5: Distinct fine and sand layers are visible in the first segment (0-50 cm) of a Russian peat core sample collected in a floodplain depression at Bacon Ridge Branch near Chesterfield Road in Annapolis.



Figure 6: USGS scientists await the signal to begin vibracore collection in a sedge clearing (most downstream sample point) in Bacon Ridge Branch near Chesterfield Road in Annapolis.



Figure 7: USGS scientists ready to collect second segment (51-100 cm depth) of Russian Peat corer in a sedge clearing (most downstream sample point) in Bacon Ridge Branch near Chesterfield Road in Annapolis.



Figure 8: USGS scientists carefully wrap Russian peat core segment from the sedge clearing (most downstream sample point) in Bacon Ridge Branch near Chesterfield Road in Annapolis.



Figure 9: Upstream-most sample location in marshy conditions upstream of Chesterfield Road in Bacon Ridge Branch in Annapolis.



Figure 10: In contrast to downstream of Chesterfield Road, the channel is covered in dense emergent vegetation at the sample location in marshy conditions upstream of Chesterfield Road in Bacon Ridge Branch in Annapolis.



Figure 11: A mantis decides to come join the excitement at the sample location in marshy conditions upstream of Chesterfield Road in Bacon Ridge Branch in Annapoli



Figure 12: USGS scientist readies Russian peat corer for collection at the sample location in marshy conditions upstream of Chesterfield Road in Bacon Ridge Branch in Annapolis.



Figure 13: USGS scientists complete collection of Russian peat corer segment 7 of at the sample location in marshy conditions upstream of Chesterfield Road in Bacon Ridge Branch in Annapolis.



Figure 14: USGS scientists retrieve length of Russian peat corer at the sample location in marshy conditions upstream of Chesterfield Road in Bacon Ridge Branch in Annapolis. Full length of core was approximately 4.8 meters of high-quality uncompacted sediment.



Figure 15: Clear bands of fine sediment are exposed within a Russian peat corer segment at the sample location in marshy conditions upstream of Chesterfield Road in Bacon Ridge Branch in Annapolis. Full length of core was approximately 4.8 meters of high-quality uncompacted sediment.



Figure 16: USGS field crew after the conclusion of hard days' sampling.